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GPO: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. **Give corporate author, title, personal author, and catalog or stock number.**

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See publication: Articles in journals, papers in proceedings, or chapters in books are found in the publication cited. These publications may be in libraries or purchased from publishers or dealers.

SAE: Society of Automotive Engineers, Dept. HSL, 400 Commonwealth Drive, Warrendale, Pa. 15096. Order by title and SAE report number.

TRB: Transportation Research Board, National Academy of Sciences, 2101 Constitution Ave., N.W., Washington, D.C. 20418.

Corporate author: Inquiries should be addressed to the organization listed in the individual citation.

ABSTRACT CITATIONS

SAMPLE ENTRIES

FORMAT OF ENTRIES IN HIGHWAY SAFETY LITERATURE

NHTSA accession number ----- HS-013 124

Title of document ----- **MAXIMUM BRAKE PEDAL FORCES PRODUCED BY
MALE AND FEMALE DRIVERS**

Abstract ----- The object of this research was to obtain data concerning the maximum amount of brake pedal force that automobile drivers were able to sustain over a period of ten seconds. Subjects were told to apply the brakes in the test car as they would in a panic stop, and to exert as much force as possible on the pedal over the entire ten second test period. A total of 84 subjects were tested, including 42 males and 42 females. The results indicated that there is a wide distribution of values which characterizes the pedal force that the subjects were able to generate. Male subjects produced generally higher forces than did females. Over half the women tested were unable to exert more than 150 lbs. of force with either foot alone, but when both feet were applied to the pedal, force levels rose significantly.

Personal author(s) ----- by C. R. VonBuseck

Corporate author (or author's affiliation) ----- General Motors Corp.

Publication date; pagination ----- 1973? ; 18p

Supplementary note ----- Excerpts from Maximum Parking Brake Forces Applied by Male and Female Drivers (EM-23) BY R. L. Bierley, 1965, are included.

Availability ----- Availability: Corporate author

NHTSA accession number ----- HS-018 924

Title of document ----- **NATURAL FREQUENCIES OF THE BIAS TIRE**

Abstract ----- The lowest natural frequencies of a bias tire under inflation pressure are deduced by assuming the bias tire as a composite structure of a bias-laminated, toroidal membrane shell and rigorously taking three displacement components into consideration. The point collocation method is used to solve a derived system of differential equations with variable coefficients. It is found that the lowest natural frequencies calculated for two kinds of bias tire agree well with the corresponding experimental results in a wide range of inflation pressures. Results of the approximate analysis show that the influences of the in-plane inertia forces on natural frequency may be considered small, but the influences of in-plane displacements are large, particularly on the natural frequency of the tire under low inflation pressure.

Personal author(s) ----- by Masami Hirano; Takashi Akasaka

Journal citation ----- Publ: Tire Science and Technology v4 n2 p86-114 (May 1976)

Publication date ----- 1976; 6refs

Availability ----- Availability: See publication

HS-022 776

**FINANCIAL CONSEQUENCES OF SERIOUS INJURY.
FINAL REPORT**

A PILOT STUDY WAS CONDUCTED TO COLLECT DATA ON THE FINANCIAL CONSEQUENCES OF SERIOUS AND WORSE TRAFFIC INJURIES THROUGH THE USE OF PERSONAL INTERVIEWS. STUDY OBJECTIVES INCLUDED THE DEVELOPMENT OF FEASIBLE METHODOLOGY AND THE COLLECTION OF ILLUSTRATIVE COSTS. A SAMPLE OF 120 CASE VEHICLE OCCUPANTS WAS RANDOMLY DRAWN FROM A POPULATION OF 241 WASHTENAW COUNTY, MICH., CASE VEHICLE OCCUPANTS WHO HAD SUSTAINED SERIOUS (OASIS-4), CRITICAL (OASIS-5), OR FATAL (OASIS 6-10) INJURIES DURING THE PERIOD OF DEC 1967 THROUGH DEC 1974. THE RESULTS INDICATE THAT A PERSONAL INTERVIEW IS A RELIABLE METHOD FOR COLLECTING CONSEQUENCES OF OASIS-4 AND OASIS-5 INJURIES BUT THAT LOCATING ACCIDENT VICTIMS CAN BE DIFFICULT. DUE TO CONSISTENT NEGATIVE REACTIONS, INTERVIEWS WERE NOT CONDUCTED FOR FATAL CASES. DATA ON LOST WAGES, MEDICAL COSTS, IMPAIRMENT, PROPERTY DAMAGE, LEGAL COSTS, ACTIVITY RESTRICTIONS, AND LOSS RECOVERY WERE COLLECTED. THE CONSEQUENCES OF OASIS-4 AND OASIS-5 INJURIES ARE DISTINCTLY DIFFERENT FROM THE LOWER-LEVEL INJURIES. SOME 21 OF THE PERSONS INTERVIEWED HAD SUSTAINED SEVERE CLOSED-HEAD INJURIES RESULTING IN LOSS OF CONSCIOUSNESS, COMA, OR A HIGH DEGREE OF DISORIENTATION. IN MORE THAN HALF OF THESE CASES THE PERSONS STILL (THREE TO NINE YEARS LATER) REPORT OCCASIONAL EPISODES OF DIZZINESS, POOR COORDINATION, LOSS OF FINE MOTOR CONTROL, OR SPEECH SLUR. MORE THAN HALF OF THESE PERSONS HAVE SOME CONTINUING PHYSICAL IMPAIRMENT. THE IN-DEPTH INTERVIEWS BROUGHT BOTH TO PATIENTS AND TO THEIR FAMILIES. FIVE APPENDICES PRESENT PREVIOUS STUDIES ON FINANCIAL CONSEQUENCES OF AUTO ACCIDENTS; SAMPLE LETTERS AND INTERVIEW GUIDE; DATA COLLECTION INSTRUMENT; AND HUMAN SUBJECTS COMMITTEE APPROVAL.

by JOSEPH C. MARSH, 4TH; RICHARD J. KAPLAN;
SUSAN M. KORNFIELD
UNIVERSITY OF MICHIGAN, HWY. SAFETY RES.
INST., ANN ARBOR, MICH. 48109
361122
Rept. No. UM-HSRI-77-27; 1977; 74P 15REFS
REPT. FOR NOV 1976-MAY 1977.
Availability: CORPORATE AUTHOR

HS-022 908

**A NEW DESIGN FOR THE HIGH-PERFORMANCE
SODIUM-SULFUR BATTERY**

A NEW DESIGN FOR THE SODIUM-SULFUR BATTERY WHICH PROVIDES A HIGHER AND MORE STABLE PERFORMANCE THAN A PREVIOUS DESIGN EMPLOYS A NEW CELL CONSTRUCTION INCLUDING A NEW METHOD TO JOIN THE SOLID ELECTROLYTE TUBE

WITH THE SODIUM RESERVOIR MADE OF METAL, AND AN IMPROVED COMPOSITION OF THE CELL CASE TO SOLVE THE PROBLEMS OF PREMATURE CELL DESTRUCTION AND CAPACITY DECREASE ASSOCIATED WITH THE EARLIER DESIGN. INCREASE IN THE YIELD IN ASSEMBLING, DECREASE IN THE VARIATION IN INITIAL CAPACITIES, AND IMPROVEMENT IN CELL RELIABILITY, CAPACITY, AND LIFE PERFORMANCE HAVE BEEN ACHIEVED, AND AN ENERGY DENSITY OF MORE THAN 180 WH/KG AND A LIFE CYCLE OF MORE THAN 300 CYCLES (60% DISCHARGE DEPTH) WERE OBTAINED. THE CAPACITY DECREASE WITH CYCLING IS MAINLY THE RESULT OF THE DECREASE IN THE AMOUNT OF SULFUR REQUIRED FOR THE ELECTROCHEMICAL REACTION IN THE POSITIVE ACTIVE MATERIAL WHICH IS BROUGHT ABOUT BECAUSE SULFUR REACTS WITH THE METAL OF THE CELL CASE TO BECOME METAL SULFIDE. SINCE A CELL OF THIS IMPROVED DESIGN HAS SHOWN THE PERFORMANCE REQUIRED FOR PRACTICAL USE IN ELECTRIC VEHICLE BATTERIES, THE GOAL IS TO FABRICATE A LARGER BATTERY WITH AN OUTPUT OF APPROXIMATELY 5.8 KW.

by SEISAKU HATTORI; MASAO YAMAURA; SHUZO KIMURA; SUMINOBU IWABUCHI
YUASA BATTERY CO., LTD., JAPAN
Rept. No. SAE-770281; 1977; 11P 5REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977. RESEARCH SPONSORED BY AGENCY OF INDUSTRIAL SCIENCE AND TECHNOLOGY, JAPAN MINISTRY OF INTERNATIONAL TRADE AND INDUSTRY.
Availability: SAE

HS-022 909

MOTORCYCLE DYNAMICS AND RIDER CONTROL

A COMPILATION OF PAPERS THAT INDICATES TO SOME EXTENT THE STATE OF THE ART OF MOTORCYCLE HANDLING ANALYSIS AND TESTING IS PRESENTED. THE TOPICS DISCUSSED INCLUDE THE FOLLOWING: A REVIEW OF MOTORCYCLE STEERING BEHAVIOR AND STRAIGHT LINE STABILITY CHARACTERISTICS; LATERAL-DIRECTIONAL MOTORCYCLE DYNAMICS AND RIDER CONTROL; THE EFFECT OF FRAME FLEXIBILITY ON HIGH SPEED WEAVE OF MOTORCYCLES; THE OSCILLATIONS OF A FLEXIBLE CASTOR, AND THE EFFECT OF FRONT FORK FLEXIBILITY ON THE STABILITY OF MOTORCYCLES; THE MEASUREMENT OF MOTORCYCLE BRAKING PERFORMANCE BY THE TOW METHOD; MOTORCYCLE DYNAMICS-FACT, FICTION AND FOLKLORE; THE HUMAN FACTORS PORTION OF THE MOTORCYCLE DYNAMICS AND HANDLING EQUATION; RIDER SKILL INFLUENCES ON MOTORCYCLE MANEUVERING; DEVELOPMENT OF HANDLING TEST PROCEDURES FOR MOTORCYCLES; AND RIDING BEHAVIOR OF MOTORCYCLISTS AS INFLUENCED BY PAVEMENT CHARACTERISTICS. IN ADDITION, A BIBLIOGRAPHY ON MOTORCYCLE DYNAMICS AND HANDLING COMPILED BY THE SAE MOTORCYCLE DYNAMICS SUBCOMMITTEE, 1977, IS PRESENTED

WHICH IS INTENDED TO BE REPRESENTATIVE (IF NOT INCLUSIVE) OF THE MATERIAL AVAILABLE IN ENGLISH.

SOCIETY OF AUTOMOTIVE ENGINEERS, INC., 400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096
Rept. No. SAE-SP-428; 1978; 121P REFS
INCLUDES HS-022 910-HS-022 919. PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 27 FEB-3 MAR 1978.
Availability: SAE

HS-022 910

A REVIEW OF MOTORCYCLE STEERING BEHAVIOR AND STRAIGHT LINE STABILITY CHARACTERISTICS

THE DESCRIPTION OF THE PRACTICAL ASPECTS OF MOTORCYCLE STEERING RELIES PARTLY ON THE SMALL AMOUNT OF SCIENTIFIC EXPERIMENTAL WORK WHICH HAS BEEN COMPLETED AND PARTLY ON ANECDOTAL INFORMATION. AN ATTEMPT IS MADE TO DESCRIBE THE CURRENT STATE OF UNDERSTANDING OF THE SUBJECT PARTICULARLY FROM THE STANDPOINT OF THE VEHICLE ALONE, BUT SOME DISCUSSION OF RIDER ABILITIES AND REQUIREMENTS IS ALSO INCLUDED. THE ACCURATE CALCULATION OF CAPSIZE MODE AND WEAVE MODE CHARACTERISTICS FROM STRAIGHT RUNNING IS PROBABLY POSSIBLE, GIVEN ACCURATE DATA ON MASS, GEOMETRICAL, TIRE, DAMPING, AERODYNAMIC, AND, WITH LESS STRUCTURALLY STIFF MOTORCYCLES, FLEXIBILITY PROPERTIES. OVER MOST OF THE SPEED RANGE, STABILIZING THE CAPSIZE MODE IS PROBABLY NOT AT ALL ONEROUS FOR THE AVERAGE RIDER, BUT AT VERY LOW SPEEDS IT IS OBVIOUSLY DIFFICULT; THERE IS SOME POSSIBILITY THAT IT REQUIRES SIGNIFICANT EFFORT AT HIGH SPEEDS. THE DIFFICULTY OF THE TASK AT HIGH SPEEDS WILL BE RESPONSIVE TO DESIGN CHANGES AND CAN BE CONTROLLED TO SOME EXTENT, BUT WILL NORMALLY INCREASE WITH DECELERATION. THE WOBBLE MODE FREQUENTLY APPEARS TO BE REASONABLY ACCURATELY CALCULABLE, BUT THE DAMPING PREDICTED IS NORMALLY TOO HIGH AT MEDIUM SPEEDS AND NOT HIGH ENOUGH AT HIGH SPEEDS. MORE DETAILED TREATMENTS OF THE TIRES AND THE STRUCTURAL PROPERTIES OF THE RIDER AND POSSIBLY THE FRAME MAY BE REQUIRED. THERE IS A GREAT SHORTAGE OF EXPERIMENTAL RESULTS ON MOTORCYCLE MOTIONS, MOTORCYCLE TIRE BEHAVIOR, THE STRUCTURAL PROPERTIES MENTIONED, AND AERODYNAMIC CHARACTERISTICS, WHICH MAKE ABSOLUTELY DEFINITE STATEMENTS OF THE CURRENT POSITION UNWISE; THE SUBJECT NEEDS EXPERIMENTAL WORK WITH PARAMETER MEASUREMENT AND THEORETICAL BACK-UP. RESPONSES TO LOW FREQUENCY INPUTS CAN BE EXPECTED TO BE ACCURATELY CALCULABLE WHEN THE CAPSIZE AND WEAVE MODE CHARACTERISTICS ARE. NORMAL CONTROL INPUTS HAVE VERY LITTLE HIGH FREQUENCY CONTENT, SO THE MAIN REQUIREMENT OF THE WOBBLE MODE IS THAT IT SHOULD BE STABLE. IF IT IS VERY LIGHTLY DAMPED, HOWEVER, EXCESSIVE OSCILLATIONS

MAY RESULT FROM WHEEL UNBALANCE, TIRE IMPERFECTIONS AND/OR ROAD IRREGULARITIES. THE WAY IN WHICH THE WEAVE MODE ALTERS IN TURNING IS PARTIALLY UNDERSTOOD, AND CAPSIZE MODE STABILITY IN TURNS SHOULD BE DETERMINABLE APPROXIMATELY WITH CURRENTLY AVAILABLE TECHNIQUES AND DATA.

by R. S. SHARP
UNIVERSITY OF LEEDS, DEPT. OF MECHANICAL ENGINEERING, UNITED KINGDOM
Publ: HS-022 909 (SAE-SP-428), "MOTORCYCLE DYNAMICS AND RIDER CONTROL," WARRENDALE, PA., 1978 P1-6
Rept. No. SAE-780303; 1978; 20REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 27 FEB-4 MAR 1978.
Availability: IN HS-022 909

HS-022 911

LATERAL-DIRECTIONAL MOTORCYCLE DYNAMICS AND RIDER CONTROL

A THEORETICAL AND EMPIRICAL VIEW IS TAKEN OF MOTORCYCLE LATERAL-DIRECTIONAL DYNAMICS, HANDLING, AND RIDER CONTROL BEHAVIOR. THE ANALYTICAL DEVELOPMENT INCLUDES EQUATIONS OF MOTION FOR THE VEHICLE (THE DERIVATION OF WHICH IS APPENDED) AND A MULTIPLE LOOP FEED-BACK MODEL FOR THE CONTROL RESPONSE OF THE RIDER/CYCLE SYSTEM. CONNECTIONS WITH MANUAL CONTROL AND VEHICLE RESPONSE DATA ARE SHOWN. THE EFFECTS OF CHANGING FORK GEOMETRY, OPERATING CONDITIONS, AND TIRE LAG PROPERTIES ARE DISCUSSED. IMPLICATIONS ARE DRAWN FOR HANDLING REQUIREMENTS, VEHICLE DESIGN, AND RIDER CONTROL TECHNIQUES. THE CAPSIZE MODE IS THE DOMINANT PARAMETER IN THE INNER LOOP FROM A RIDER CONTROL STANDPOINT, AND THE ROLL LOOP CROSSOVER FREQUENCY DETERMINES THE LOCATION OF THE DYNAMIC MODES FOR HEADING CONTROL. THE WEAVE AND WOBBLE MODES ARE IMPORTANT, BUT THEY ARE RELATIVELY HIGH FREQUENCY, TYPICALLY, AND RIDER CONTROL DOES NOT INFLUENCE THEM UNLESS THEY ARE VERY LIGHTLY DAMPED. THE WOBBLE MODE, AND TO SOME EXTENT THE WEAVE MODE, CAN BE ANALYZED AND SPECIFIED BY CONSIDERING THE VEHICLE DYNAMICS ALONE. HOWEVER, IF A CONFIGURATION CHANGE SERVES TO REDUCE THE DAMPING OF THE WEAVE AND WOBBLE MODES, OR IF IT MOVES THE WEAVE MODE TO LOWER FREQUENCY, THEN RIDER ROLL MAY HAVE AN IMPORTANT EFFECT. A PRELIMINARY "SPECIFICATION" OF THE LATERAL-DIRECTIONAL DYNAMIC PROPERTIES OF THE MOTORCYCLE WHICH ARE IDEAL FROM A RIDER CONTROL STANDPOINT INCLUDES THE FOLLOWING: A VERY SMALL INVERSE TIME CONSTANT FOR THE CAPSIZE MODE IN ORDER TO GIVE GOOD LOW FREQUENCY PROPERTIES AND MID FREQUENCY PATH DAMPING, STABILITY OF THE CAPSIZE MODE WITH THE CYCLE ALONE (OPEN LOOP) FOR MINIMUM RIDER CONTROL WORKLOAD, WELL DAMPED WEAVE AND WOBBLE MODES WITH A HIGH NATURAL FREQUENCY RELATIVE TO THE

FREQUENCY REGION OF RIDER CONTROL, NO ADVERSE VEHICLE EFFECTS WHICH WOULD REDUCE THE BANDWIDTH AND DAMPING FOR HEADING CONTROL, AND AN EFFECTIVE CONTROLLED ELEMENT GAIN FOR STEER TORQUE AND RIDER LEAN CONTROL SUCH THAT RIDER CONTROL ACTIONS OF NOMINAL AMPLITUDE PROVIDE CROSSOVER FREQUENCY.

by DAVID H. WEIR; JOHN W. ZELLNER
SYSTEMS TECHNOLOGY, INC., HAWTHORNE, CALIF.
Publ: HS-022 909 (SAE-SP-428), "MOTORCYCLE DYNAMICS AND RIDER CONTROL," WARRENDALE, PA., 1978 P7-31
Rept. No. SAE-780304; 1978; 21REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 27 FEB-4 MAR 1978.
Availability: IN HS-022 909

HS-022 912

THE EFFECT OF FRAME FLEXIBILITY ON HIGH SPEED WEAVE OF MOTORCYCLES

THE EFFECT OF FRAME FLEXIBILITY ON THE STABILITY OF CONSTANT SPEED, STRAIGHT LINE MOTIONS OF A MOTORCYCLE IS STUDIED BY REFERENCE TO LINEARIZED DIFFERENTIAL EQUATIONS GOVERNING THE BEHAVIOR OF A SYSTEM OF FIVE RIGID BODIES. TWO OF THE RIGID BODIES ARE CONNECTED TO EACH OTHER WITH A HINGE, A SPRING, AND A DAMPER; THEY ARE INTENDED TO REPRESENT A FLEXIBLE FRAME, WHILE THE REST REPRESENT THE FRONT FORK AND THE WHEELS OF THE VEHICLE. ALTHOUGH THE CONFIGURATION OF THE SYSTEM IS CHARACTERIZED BY SEVEN GENERALIZED COORDINATES, THE STABILITY INFORMATION OF INTEREST CAN BE DEDUCED FROM FOUR FIRST-ORDER DIFFERENTIAL EQUATIONS.

by THOMAS R. KANE
STANFORD UNIV., DEPT. OF MECHANICAL ENGINEERING, STANFORD, CALIF.
Publ: HS-022 909 (SAE-SP-428), "MOTORCYCLE DYNAMICS AND RIDER CONTROL," WARRENDALE, PA., 1978 P33-40
Rept. No. SAE-780306; 1978; 4REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 27 FEB-4 MAR 1978.
Availability: IN HS-022 909

HS-022 913

THE OSCILLATIONS OF A FLEXIBLE CASTOR, AND THE EFFECT OF FRONT FORK FLEXIBILITY ON THE STABILITY OF MOTORCYCLES

A MECHANISM OF CASTOR OSCILLATION IS PROPOSED BASED ON LATERAL FLEXIBILITY IN THE WHEEL SUPPORT, WITHOUT ANY DYNAMICAL CONTRIBUTION FROM A PNEUMATIC TIRE BEING NECESSARY. IN THE CASE OF A MOTORCYCLE THIS IS THE FLEXIBILITY IN THE FRONT FORK/WHEEL SYSTEM. FOR SMALL AMPLITUDE OSCILLATIONS THE EQUATIONS OF MOTION ARE SHOWN TO BE COUPLED ORDINARY DIFFERENTIAL EQUATIONS WHICH CON-

TAIN TERMS REPRESENTING A RELAY SWITCHING FUNCTION. THESE EQUATIONS ARE SOLVED NUMERICALLY FOR MANY PARAMETER VARIATIONS. CLOSE AGREEMENT WITH THE REAL SYSTEM OF MOTORCYCLE FRONT-WHEEL WOBBLE IN AMPLITUDE, FREQUENCY, AND CHARACTER OF OSCILLATION IS OBTAINED. FOR CERTAIN SETS OF PARAMETERS THE NUMERICAL SOLUTIONS ARE ALSO FOUND TO AGREE WELL WITH THE PREDICTED SOLUTIONS OBTAINED USING AN ANALYTIC TECHNIQUE. FROM THE RESULTS IT IS VERY CLEAR THAT THE MOST IMPORTANT PARAMETER AFFECTING STABILITY IS LATERAL STIFFNESS. A NEW MOTORCYCLE FRONT FORK OF HIGH LATERAL STIFFNESS IS DESCRIBED WHICH GIVES TOTAL STABILITY AND IMPROVED HANDLING. THIS FORK HAS ALREADY ACHIEVED SUCCESS ON THE ROAD, TEST TRACK, AND RACE TRACK.

by G. E. ROE; W. M. PICKERING; A. ZINOBER
UNIVERSITY OF MANCHESTER, SIMON ENGINEERING LAB., ENGLAND; UNIVERSITY OF SHEFFIELD, DEPT. OF APPLIED MATHS AND COMPUTING SCIENCE, ENGLAND
Publ: HS-022 909 (SAE-SP-428), "MOTORCYCLE DYNAMICS AND RIDER CONTROL," WARRENDALE, PA., 1978 P41-52
Rept. No. SAE-780307; 1978; 15REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 27 FEB-4 MAR 1978.
Availability: IN HS-022 909

HS-022 914

THE MEASUREMENT OF MOTORCYCLE BRAKING PERFORMANCE BY THE TOW METHOD

AS PART OF A STUDY TO CONDUCT AND EVALUATE THE EXISTING MOTORCYCLE BRAKE SYSTEMS STANDARD, FEDERAL MOTOR VEHICLE SAFETY STANDARD (FMVSS) 122, AND TO DEVELOP A REVISED METHOD WHICH RESOLVES SHORTCOMINGS IN THAT STANDARD, A TEST METHODOLOGY WAS DEVELOPED FOR OBJECTIFYING THE MEASUREMENT OF MOTORCYCLE BRAKING PERFORMANCE THROUGH THE USE OF A TOWING TECHNIQUE. THE CONCEPTUAL BASIS FOR THE TOWING METHOD IS OUTLINED, THE PROCEDURE ITSELF IS DESCRIBED, AND RESULTS OF A FULL-SCALE DEMONSTRATION OF THE METHOD ARE PRESENTED. THE NEW METHODOLOGY OBJECTIFIES THE TEST PROCESS, SPECIFYING ALL BRAKE CONTROL INPUTS WITHIN A SEQUENCE OF FRONT-ONLY AND REAR-ONLY APPLICATIONS. THE TEST PROCEDURE NOT ONLY OBJECTIFIES THE DISTRIBUTION OF BRAKING INPUTS FOR BURNISHING AND THERMAL LOADING APPLICATIONS, IT ALSO ELIMINATES THE RIDER SKILL INFLUENCE FROM LIMIT BRAKING MEASUREMENT. IN FULL-SCALE TESTS, THIS PROCEDURE HAS BEEN FOUND TO BE PRACTICABLE AND SUITED TO THE GENERAL SCENARIO OF A FEDERAL RULE ON MOTORCYCLE BRAKING PERFORMANCE. THE DEVELOPED METHODOLOGY HAS ALSO BEEN FOUND ADAPTABLE TO ADVANCED BRAKING SYSTEMS SUCH AS MAY BE ANTICIPATED TO EVOLVE WITHIN THE NEXT TEN YEARS IN THE MOTORCYCLE MARKET

ON THE BASIS OF THE CONCEPTUAL FOUNDATION OF THE METHODOLOGY, ITS SUCCESSFUL DEMONSTRATION IN FULL-SCALE TRIALS, AND ITS APPLICABILITY TO FUTURE BRAKE SYSTEMS, THE TECHNIQUE IS RECOMMENDED FOR DEVELOPMENT INTO A NEXT-GENERATION MOTORCYCLE BRAKING STANDARD.

by R. D. ERVIN; C. C. MACADAM; Y. WATANABE
UNIVERSITY OF MICHIGAN, HWY. SAFETY RES. INST.
DOT-HS-5-01264
Publ: HS-022 909 (SAE-SP-428), "MOTORCYCLE DYNAMICS AND RIDER CONTROL," WARRENDALE, PA., 1978 P53-62
Rept. No. SAE-780308; 1978; 1REF
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 27 FEB-4 MAR 1978.
Availability: IN HS-022 909

HS-022 915

MOTORCYCLE DYNAMICS--FACT, FICTION AND FOLKLORE

AN OVERVIEW IS PRESENTED OF SOME OF THE LINGERING QUESTIONS REGARDING MOTORCYCLE DYNAMICS, A FIELD WHERE TECHNICAL AND IDEOLOGICAL CONFLICTS EXIST. THERE SEEM TO BE TWO DISTINCT CAMPS IN THE MOTORCYCLE DYNAMICS FIELD AT THE PRESENT TIME. THE FIRST IS THE EXPERIENCED MOTORCYCLIST, OFTEN A SELFPROCLAIMED EXPERT ON DYNAMICS AS WELL AS OTHER AREAS OF MOTORCYCLE TECHNOLOGY, GENERALLY LACKING IN TECHNICAL TRAINING, INVARIABLY A BROADCASTER OF INFLEXIBLE OPINIONS LARGELY PREDICATED UPON HEARSAY FROM OTHER PERSONS WHO ALSO DO NOT HAVE THE TECHNICAL KNOWLEDGE. IN THE OTHER CAMP ARE THE ENGINEERS AND SCIENTISTS WHO ARE HEAVILY INVOLVED WITH COMPUTER MODELING, HIGHLY TRAINED AND SKILLED IN THEORETICAL STABILITY ANALYSIS BUT TOTALLY WITHOUT ANY PRACTICAL KNOWLEDGE OF MOTORCYCLE PERFORMANCE. CURRENT OUTPUT FROM MINIMAL SCIENTIFIC RESEARCH IN MOTORCYCLE HANDLING AND RESPONSE PROVIDES DIRECT CONTRADICTION OF SOME ERRONEOUS MOTORCYCLIST THEORIES BUT FAILS TO PROVIDE DEFINITION OF OPTIMUM MOTORCYCLE CHASSIS DESIGN PARAMETERS. THE MOTORCYCLIST THEORIES DISCUSSED INCLUDE THE FOLLOWING: LAY THE BIKE DOWN WHEN FACED WITH PERIL; CLASSIC BIKES HANDLE BEST; IF SHE WOBBLER, ACCELERATE; GAS IT IN THE TURN; BIG TIRES AND STIFF SHOCKS ARE THE ANSWERS; FRONT BRAKES WILL THROW YOU ON YOUR NOSE; ANYONE CAN RIDE A BIKE IN A FEW MINUTES; AND DUAL-PURPOSE MOTORCYCLES. THE RELATIONSHIP OF PRODUCT LIABILITY AND MOTORCYCLE DYNAMICS IS ALSO DISCUSSED. IN THIS REGARD A GREAT DEAL OF SPECULATION GOES ON IN THE COURTROOM BECAUSE THOSE INVOLVED IN PRODUCT LIABILITY LITIGATION USUALLY HAVE

LITTLE OR NO DEMONSTRABLE BACKGROUND IN MOTORCYCLE DYNAMICS.

by JON S. MCKIBBEN
MCKIBBEN ENGINEERING CORP.
Publ: HS-022 909 (SAE-SP-428), "MOTORCYCLE DYNAMICS AND RIDER CONTROL," WARRENDALE, PA., 1978 P63-71
Rept. No. SAE-780309; 1978
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 27 FEB-4 MAR 1978.
Availability: IN HS-022 909

HS-022 916

THE HUMAN FACTORS PORTION OF THE MOTORCYCLE DYNAMICS AND HANDLING EQUATION

A SYSTEMATIC THREE-PHASE PLAN IS BEING IMPLEMENTED WHICH HOLDS PROMISE FOR REDUCING MOTORCYCLE ACCIDENTS AND INJURIES THROUGH MOTORCYCLE OPERATOR EDUCATION AND LICENSING IMPROVEMENT. THROUGH A UNIQUE PUBLIC-PRIVATE (NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION (NHTSA)-MOTORCYCLE SAFETY FOUNDATION (MSF)) SECTOR PARTNERSHIP, MOTORCYCLE TASK ANALYSIS RESEARCH HAS BEEN COMPLETED, AND AN EVALUATION OF THE EFFECTIVENESS OF AN IMPROVED MOTORCYCLE OPERATOR LICENSING EXAMINATION IS UNDERWAY WITH A COMPLETION DATE IN 1979. AN EVALUATION OF THE EFFECTIVENESS OF A MOTORCYCLE OPERATOR EDUCATION PROGRAM IS IN ITS EARLY STAGES. IMPROVED OPERATOR HANDLING CAPABILITY CAN BE ANTICIPATED UPON COMPLETION OF THIS RESEARCH AND DEVELOPMENT EFFORT. SUCCESSFUL IMPLEMENTATION PROMISES A REDUCED LIKELIHOOD OF ACCIDENT INVOLVEMENT DURING THE INITIAL MONTHS OF MOTORCYCLE OPERATION.

by CHARLES H. HARTMAN
MOTORCYCLE SAFETY FOUNDATION, LINTHICUM, MD.
Publ: HS-022 909 (SAE-SP-428), "MOTORCYCLE DYNAMICS AND RIDER CONTROL," WARRENDALE, PA., 1978 P73-8
Rept. No. SAE-780311; 1978; 11REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 27 FEB-4 MAR 1978.
Availability: IN HS-022 909

HS-022 917

RIDER SKILL INFLUENCES ON MOTORCYCLE MANEUVERING

FULL-SCALE TESTS IN LANE CHANGE MANEUVERING AT MODERATE SPEED WERE CONDUCTED USING FOUR RIDERS OF VARYING EXPERIENCE EACH OPERATING THE SAME MOTORCYCLE. MEASUREMENTS OF RIDER INPUT (STEER ANGLE, STEERING TORQUE, AND LEAN ANGLE) AND OF VEHICLE RESPONSE (ROLL ANGLE AND YAW RATE AT CONSTANT SPEED) ARE USED TO COMPARE RIDING TECHNIQUES. THE EFFECTS OF SKILL AND EX-

PERIENCE ARE EXAMINED BY MEANS OF GRAPHICAL REPRESENTATIONS OF RIDER OPERATIONS. TEST COURSE GEOMETRY, INSTRUMENTATION METHODS, MOTORCYCLE CHARACTERISTICS, AND RIDER BACKGROUNDS ARE DESCRIBED. IT IS SHOWN THAT THE EXPERIENCED RIDER PERFORMS MORE SMOOTHLY AND EFFICIENTLY AND ACHIEVES A HIGHER LIMIT THAN THOSE WITH LESS EXPERIENCE.

by ROY S. RICE
CALSPAN CORP., TRANSPORTATION RES. DEPT.,
BUFFALO, N.Y.
Publ: HS-022 909 (SAE-SP-428), "MOTORCYCLE
DYNAMICS AND RIDER CONTROL," WARRENDALE,
PA., 1978 P79-90
Rept. No. SAE-780312; 1978; 7REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE
ENGINEERING CONGRESS AND EXPOSITION,
DETROIT, 27 FEB-4 MAR 1978. BASED ON RESEARCH
CONDUCTED FOR NATIONAL HWY. TRAFFIC SAFETY
ADMINISTRATION (NHTSA).
Availability: IN HS-022 909

HS-022 918

DEVELOPMENT OF HANDLING TEST PROCEDURES FOR MOTORCYCLES

IN A STUDY TO DEVELOP LATERAL-DIRECTIONAL HANDLING TEST PROCEDURES FOR MOTORCYCLES, THE FIRST OF THE TEST PROCEDURES CONSIDERED IS A STEADY-STATE TURN, ACCOMPLISHED WITH A RANGE OF FORWARD SPEEDS AND TURN RADII; THE SECOND PROCEDURE IS A SINGLE-LANE CHANGE MANEUVER, USING VARIOUS DEGREES OF SEVERITY AND FORWARD SPEEDS. FIVE EXAMPLE MOTORCYCLES WERE STUDIED ANALYTICALLY AND VIA FULL-SCALE TESTS. DATA FROM ON-BOARD INSTRUMENTATION SHOW THE EFFECTS OF VEHICLE AND OPERATIONAL DIFFERENCES ON SELECTED RESPONSE AND PERFORMANCE MEASURES. INTERIM RESULTS ARE GRAPHED FOR THE FOLLOWING: RELATION OF STEER TORQUE AND ROLL ANGLE; RELATION OF YAW VELOCITY AND STEER ANGLE; BEHAVIOR OF REAL ROOTS FOR STEER TORQUE AND STEER ANGLE RESPONSES; RELATION OF STEER TORQUE AND STEER ANGLE; AND ROOT MEAN SQUARE LATERAL POSITION DEVIATION IN STEADY TURNS.

by JOHN W. ZELLNER; DAVID H. WEIR
SYSTEMS TECHNOLOGY INC., HAWTHORNE, CALIF.
Publ: HS-022 909 (SAE-SP-428), "MOTORCYCLE
DYNAMICS AND RIDER CONTROL," WARRENDALE,
PA., 1978 P91-100
Rept. No. SAE-780313; 1978; 11REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE
ENGINEERING CONGRESS AND EXPOSITION,
DETROIT, 27 FEB-4 MAR 1978. BASED PARTLY ON
RESEARCH CONDUCTED UNDER CONTRACT DOT-HS-
5-01381.
Availability: IN HS-022 909

HS-022 919

RIDING BEHAVIOR OF MOTORCYCLISTS AS INFLUENCED BY PAVEMENT CHARACTERISTICS

IN THIS STUDY, RIDING A MOTORCYCLE ON ROUGHENED AND GROOVED PAVEMENTS WAS COMPARED WITH RIDING ON NORMAL ASPHALT AND COBBLESTONE. RUNS WERE MADE ON BOTH STRAIGHT AND CURVED SECTIONS OF ROAD WITHOUT INTERFERENCE OF OTHER TRAFFIC; THE MAIN TASKS OF THE RIDERS WERE LATERAL AND LONGITUDINAL MOTORCYCLE CONTROL. GROOVES WERE MADE 6MM WIDE WITH A 45 MM INTERSPACE AND 4 MM WIDE WITH 25 MM INTERSPACE; OTHER SURFACES TESTED WERE ROUGHENED PAVEMENT, NORMAL ASPHALT, AND COBBLES. OVERALL RESULTS OF BOTH OBJECTIVE AND SUBJECTIVE DATA SEEM TO JUSTIFY THAT GROOVED AND ROUGHENED PAVEMENTS INDEED MAY INFLUENCE NEGATIVELY THE RIDING BEHAVIOR OF MOTORCYCLISTS. IN ADDITION, IN THE CASE OF GROOVES, DIFFERENCES IN GROOVE DIMENSIONS LEAD TO DIFFERENT EFFECTS; THE SMALLER GROOVES WITH SMALLER INTERSPACES HARDLY SHOWED AN EFFECT.

by G. J. BLAAUW; J. GODTHELP
INSTITUTE FOR PERCEPTION TNO, THE
NETHERLANDS
Publ: HS-022 909 (SAE-SP-428), "MOTORCYCLE
DYNAMICS AND RIDER CONTROL," WARRENDALE,
PA., 1978 P101-12
Rept. No. SAE-780314; 1978; 7REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE
ENGINEERING CONGRESS AND EXPOSITION,
DETROIT, 27 FEB-4 MAR 1978.
Availability: IN HS-022 909

HS-022 920

SUMMARY OF NATIONAL TRANSPORTATION STATISTICS. ANNUAL REPORT. 1976 ED.

A COMPENDIUM OF SELECTED NATIONAL-LEVEL TRANSPORTATION STATISTICS FOR THE PERIOD 1964 THROUGH 1974 IS PRESENTED IN THE FORM OF TREE DISPLAYS, MODAL PROFILES, AND TRANSPORTATION TRENDS. INCLUDED ARE COST, INVENTORY, AND PERFORMANCE DATA DESCRIBING THE PASSENGER AND CARGO OPERATIONS OF THE FOLLOWING MODES: AIR CARRIER, GENERAL AVIATION, AUTOMOBILE, BUS, TRUCK, LOCAL TRANSIT, RAIL, WATER, OIL PIPELINE, AND GAS PIPELINE. BASIC DESCRIPTORS OF U.S. TRANSPORTATION, SUCH AS OPERATING REVENUES AND EXPENSES, NUMBER OF VEHICLES AND EMPLOYEES, VEHICLE MILES, AND PASSENGER MILES, ETC., ARE INCLUDED. THE INFORMATION IS A SUMMARY OF A LARGER DATA BASE CONSISTING OF TIME-SERIES COLLECTED FROM A VARIETY OF GOVERNMENT AND PRIVATE STATISTICAL HANDBOOKS. APPENDICES CONTAIN SOURCE INFORMATION, A GLOSSARY, A DISCUSSION OF THE ROLE OF BICYCLING IN TRANSPORTATION

AND TRAFFIC SAFETY SYSTEMS, AND A BIBLIOGRAPHY.

by WILLIAM F. GAY
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SQUARE, CAMBRIDGE, MASS. 02152
Rept. No. DOT-TSC-OST-76-11; AR-6; 1976; 117P 57REFS
REPT. FOR JAN 1964-DEC 1974.
Availability: GPO \$1.85, STOCK NO. 050-000-00118-1

HS-022 921

ILLINOIS MOTORCYCLE HELMET USE SURVEY

A SURVEY WAS MADE TO DETERMINE THE DEGREE OF VOLUNTARY USAGE OF HELMETS BY MOTORCYCLISTS WHO WERE RIDING ON ILLINOIS STREETS AND HIGHWAYS DURING AUG 1975. DATA PRESENTED REPRESENT 53,000 OBSERVATIONS COLLECTED DURING 4300 OBSERVATION HOURS AT 220 SITES THROUGHOUT THE STATE. INCLUDED IS THE METHODOLOGY FOR ASSIGNING STUDY LOCATIONS THROUGHOUT THE STATE. STATEWIDE, 36.8% OF THE MOTORCYCLE RIDERS (INCLUDING PASSENGERS) WERE FOUND TO BE WEARING HELMETS. THERE WERE SIGNIFICANT VARIATIONS IN THE RATE RELATED TO SEX OF THE MOTORCYCLIST, TYPE OF ROADWAY, WEATHER, SIZE OF CITY, AND TIME OF DAY AND DAY OF WEEK. FEMALES, WHETHER DRIVER OR PASSENGER, WORE HELMETS MORE FREQUENTLY THAN MALES (39.9% AND 36.2%, RESPECTIVELY). THE LARGEST VARIATION IN HELMET USAGE OCCURRED ON DIFFERING TYPES OF ROADWAY, FROM 31.5% OF THE MOTORCYCLISTS WEARING HELMETS WHILE RIDING ON CITY STREETS TO 77.5% OF RIDERS WEARING HELMETS WHILE TRAVELING ON RURAL INTERSTATE HIGHWAYS. THE PERCENT OF OBSERVATIONS OF MOTORCYCLISTS WEARING HELMETS WAS HIGHER IN AREAS CONTIGUOUS TO BORDERING STATES THAN IN THE MORE INTERIOR COUNTIES. THE INFLUENCING FACTOR APPEARS TO HAVE BEEN THE REQUIREMENT OF BORDERING STATES THAT HELMETS BE WORN. THE PERCENTAGE OF HELMETED RIDERS TENDED TO BE INVERSE TO THE SIZE OF THE CITY IN WHICH THE OBSERVATION WAS MADE; THIS TREND MAY BE RELATED TO THE CLASS OF ROADWAY THAT IS OBSERVED. THE LOWEST PERCENT OF HELMET WEARING (27%) WAS OBSERVED IN CHICAGO. ON ALL TYPES OF ROADWAYS HELMET WEARING WAS TEN PERCENTAGE POINTS HIGHER WHEN IT WAS RAINING. WITH RELATION TO TIME OF DAY, THE FOLLOWING PERCENTAGES WERE DETERMINED: 6:00 A.M.-11:59 A.M., 48%; 12 NOON-5:59 P.M., 34%, AND 6:00 P.M.-1:59 A.M., 36%. OF ALL THE DAYS OF THE WEEK, THE LOWEST PERCENTAGE OF RIDERS WEARING HELMETS (33.2%) WAS OBSERVED ON SATURDAYS.

by MARIE ELLINGER
ILLINOIS DEPT. OF TRANSPORTATION, DIV. OF
TRAFFIC SAFETY
1976; 22P
Availability: CORPORATE AUTHOR

HS-022 922

PERIODIC MOTOR VEHICLE INSPECTION. ITS ACCIDENT PREVENTION POTENTIAL, COST AND BENEFIT

THE TEXT AND ACCOMPANYING CHARTS OF A PRESENTATION ON THE ACCIDENT PREVENTION POTENTIAL, COST AND BENEFIT OF PERIODIC MOTOR VEHICLE INSPECTION (PMVI) ARE PROVIDED. IT IS SHOWN THAT PMVI FOR PASSENGER CARS ADDS LITTLE TO THE VOLUNTARY EFFORTS OF VEHICLE OWNERS AND IS INEFFECTIVE IN PREVENTING ACCIDENTS, IS EXTREMELY COSTLY FOR ANY BENEFITS DERIVED, AND IS A PROGRAM THAT CANNOT BE MANDATED IN THE NAME OF THE PUBLIC INTEREST. PMVI WILL PREVENT APPROXIMATELY SIX TENTHS OF 1% OF MOTOR VEHICLE ACCIDENTS. ALSO, ESTIMATES INDICATE THAT THERE IS APPROXIMATELY A NICKEL'S WORTH OF BENEFIT FOR EACH DOLLAR SPENT ON PMVI. WITH AN ACCIDENT COST OF \$167 PER VEHICLE, AND AN INSPECTION COST OF \$20 PER VEHICLE, A 12% REDUCTION IN ACCIDENTS WOULD BE NEEDED IN ORDER TO BREAK EVEN.

by LARRY F. WORT
ILLINOIS DEPT. OF TRANSPORTATION
1976; 19P REFS
PRESENTED TO ILLINOIS MOTOR VEHICLE LAWS
COMMISSION, 12 APR 1976.
Availability: CORPORATE AUTHOR

HS-022 923

A PRIMER ON PERMANENT-MAGNET MOTORS

THE DESIGN OF A PERMANENT-MAGNET (P.M.) AUTOMOTIVE MOTOR WITH OPTIMUM CHARACTERISTICS IS ILLUSTRATED BY A 4500 RPM MOTOR DELIVERING 0.85 N.M (120 OZ IN.) CONTINUOUS TORQUE. THE MAXIMUM PERMISSIBLE ELECTRICAL LOAD IS 40 A. THE EXAMPLE MOTOR MUST PROVIDE 400 W (0.54 HP) OUTPUT AT THE LOAD POINT. THE MOTOR IS TO BE 78% EFFICIENT AT LOAD (520 W INPUT, 400 W OUTPUT). THIS REQUIREMENT IS WITHIN THE CAPABILITY OF P.M. MOTORS, BUT IT INDICATES THAT THE FLUX LEVEL AND ARMATURE DIAMETER MAY HAVE TO BE MAXIMIZED IN THIS DESIGN. THE FACT THAT IT MUST BE CAPABLE OF CONTINUOUS OPERATION INDICATES THAT THE MOTOR MUST BE COOLED AND CONFINED TO OPERATING TEMPERATURES THAT WILL NOT SIGNIFICANTLY REDUCE THE OPERATING FLUX LEVEL. BASED ON ARMATURE HEAT DISSIPATION (80-100 WATTS IN THE EXAMPLE MOTOR) AND THE HIGH EFFICIENCY REQUIREMENT OF THE DESIGN, AN INITIAL DIAMETER OF 8.9 CM WAS CHOSEN. A "STANDARD" 10-SLOT LAMINATION WAS CHOSEN, ARRANGED IN THE SKEW CONFIGURATION TO MINIMIZE MAGNETIC NOISE. CORE LENGTH AND THE WIDTH OF THE LAMINATION TEETH WILL BE PRIME VARIABLES IN DETERMINING THE OPERATING FLUX LEVEL OF THE MOTOR AND WILL THEREFORE BE CLOSELY MATCHED TO THE EVENTUAL MAGNET GRADE AND SIZE CHOSEN. WITH DEFINITION OF THESE MOTOR GOALS, THE DESIGN OF THE MOTOR IS DISCUSSED IN TERMS OF OPERATING

FLUX LEVEL, OPERATIONAL ENVIRONMENT, LOW TEMPERATURE DEMAGNETIZATION, MAGNETIC NOISE, MAGNET SIZE AND GRADE, ARMATURE WINDING, ALTERNATE MATERIALS, AND VERIFICATION AND ADJUSTMENT.

Publ: AUTOMOTIVE ENGINEERING V86 N4 P54-8 (APR 1978)

1978
BASED ON SAE-780016 "OPTIMUM PERMANENT MAGNET MOTOR DESIGN FOR AUTOMOTIVE APPLICATIONS," BY ARTHUR J. MACOIT, PRESENTED AT SAE CONGRESS, DETROIT, 27 FEB-3 MAR 1978.
Availability: SEE PUBLICATION

HS-022 924

INDEPENDENT AUTO REPAIRMEN'S VIEW OF FEDERAL AND STATE REGULATIONS. THE IMPACT ON COMPETITION AND THE MOTORING PUBLIC

THE EXISTING BODY OF LAW, EXCEPT FOR THE MOTOR VEHICLE INFORMATION AND COST SAVINGS ACT, IS ALMOST ENTIRELY ORIENTED TOWARD THE PERFORMANCE CHARACTERISTICS OF CARS TO BE CONSTRUCTED IN THE FUTURE. LITTLE ATTENTION HAS BEEN GIVEN TO REGULATIONS OR STATUTES WHICH WOULD IMPROVE THE PERFORMANCE CAPABILITY OF THE EXISTING VEHICLE POPULATION. IF PENDING FEDERAL LEGISLATION BECOMES LAW, IT WILL, IN COMBINATION WITH EXISTING FEDERAL STATUTES AND REGULATIONS AND STATE CONSUMER PROTECTION LAWS AND REGULATORY ACTIONS, DRAMATICALLY AFFECT INDEPENDENT AUTO REPAIRMEN BY SUBJECTING THEM TO RATHER SIGNIFICANT ECONOMIC AND SOCIETAL FORCES. FOR EXAMPLE, SECTION 207(B) OF THE 1970 CLEAN AIR ACT, EVEN IF AMENDED TO LIMIT THE PERFORMANCE WARRANTY (MANDATORY FEDERAL SERVICE CONTRACT) TO 18 MONTHS OR 18,000 MILES, WOULD SHIFT THESE MANDATORY PURCHASES OF ABOUT \$1 BILLION ANNUALLY EXCLUSIVELY TO THE CAR DEALERS AND AUTO MANUFACTURERS. ANOTHER EXAMPLE OF A DISRUPTIVE EFFECT WOULD BE THE PROPOSAL BY THE CALIFORNIA AIR RESOURCES BOARD FOR PREPAID MAINTENANCE AS AN INDUCEMENT FOR CAR PURCHASERS TO KEEP THEIR CARS' EMISSION SYSTEMS IN COMPLIANCE. THIS TYPE OF SYSTEM WILL BE IN ALL LIKELIHOOD UNJUSTLY EXPENSIVE FOR THE CONSUMER IN RELATION TO BENEFITS RECEIVED. IT IS ALSO SIGNIFICANT THAT ALL EMISSION-RELATED MAINTENANCE WILL, IN ALL LIKELIHOOD, BE UNDERTAKEN IN FRANCHISED DEALERSHIPS. ANOTHER MAJOR IMPACT OF THESE LAWS AND REGULATIONS WOULD BE THE FORCED INFLATIONARY COSTS FOR UNREALISTIC EXTENDED PRODUCT DURABILITY WHICH THE MANUFACTURERS ARE COMPELLED TO PRODUCE. ANOTHER IS THE REAL WORLD COST FOR THE PREDICTABLE UNCERTAINTIES THAT MANUFACTURERS FORESEE IN THE WARRANTY LIABILITY TO 2ND, 3RD, AND 4TH VEHICLE OWNERS. SUBSTANTIAL INCREASES IN THE COST OF DOING BUSINESS HAVE ALREADY BEEN BROUGHT ABOUT BY REGULATIONS AND STATUTES WHICH HAVE RESULTED IN INCREASED

PAPERWORK AND NEW AND EXPENSIVE EQUIPMENT REQUIREMENTS FOR THE AUTO REPAIRMAN. THESE COSTS INEVITABLY HAVE BEEN PASSED ON TO THE MOTORING PUBLIC. THE ADDITIONAL DANGER IS THAT AS MAINTENANCE AND REPAIR COSTS APPROACH THE UPPER LIMITS OF CONSUMER ACCEPTABILITY, THERE IS A LIKELIHOOD MANY OF THE NECESSARY AND MANDATORY REPAIRS NOW PERFORMED MAY BECOME, IN THE MINDS OF THE PUBLIC, OPTIONAL. SHOULD THIS OCCUR IN THE ABSENCE OF A VEHICLE INSPECTION AND MAINTENANCE PROGRAM, THERE WOULD INEVITABLY BE A MEASURABLE INCREASE IN THE NUMBER OF VEHICLES OPERATING WITH SERIOUSLY DEFECTIVE SAFETY, NOISE, EMISSIONS, AND FUEL SYSTEMS. ALSO, THE GOVERNMENT HAS PLACED A VERY LIMITED AMOUNT OF EMPHASIS ON THE TRAINING OF SERVICE TECHNICIANS TO KEEP UP WITH THE RAPIDLY INCREASING USE OF ELECTRONICS IN VEHICLES. FINALLY, INSPECTION/MAINTENANCE PROGRAMS ARE STRONGLY RECOMMENDED.

by DONALD A. RANDALL
AUTOMOTIVE SERVICE COUNCILS, INC., 1625 K ST.,
N.W., SUITE 1205, WASHINGTON, D.C. 20006
1977; 9P 1REF
Availability: CORPORATE AUTHOR

HS-022 925

MOTOR GASOLINES, SUMMER 1977

ANALYTICAL DATA FOR 2725 SAMPLES OF MOTOR GASOLINE FROM SERVICE STATIONS THROUGHOUT THE U.S. ARE PRESENTED IN GRAPHICAL AND TABULAR FORM. THE SAMPLES REPRESENT THE PRODUCTS OF 49 COMPANIES, LARGE AND SMALL, WHICH MANUFACTURE AND SUPPLY GASOLINE. THE DATA (GRAVITY, SULFUR CONTENT, GUM CONTENT, OCTANE NUMBER (RESEARCH, MOTOR, ANTIKNOCK INDEX), REID VAPOR PRESSURE, VAPOR-LIQUID RATIO OF 20, DISTILLATION CHARACTERISTICS, AND MANGANESE CONTENT (FOR UNLEADED GRADE)) ARE TABULATED BY GROUPS ACCORDING TO BRANDS (UNLABELED) AND GRADES FOR 17 MARKETING AREAS AND DISTRICTS INTO WHICH THE COUNTRY IS DIVIDED. A MAP SHOWS MARKETING AREAS, DISTRICTS, AND SAMPLING LOCATIONS. ALSO INCLUDED ARE CHARTS INDICATING THE TRENDS OF SELECTED PROPERTIES (OCTANE NUMBER, REID VAPOR PRESSURE, DISTILLATION TEMPERATURE) OF MOTOR FUELS SINCE 1946. TWELVE OCTANE DISTRIBUTION CHARTS FOR FOUR DESIGNATED GEOGRAPHICAL DIVISIONS OF THE U.S. (EASTERN AND GULF COAST STATES; CENTRAL STATES; MOUNTAIN STATES, INCLUDING ELEVATIONS ABOVE 3000 FEET; AND WESTERN STATES) FOR UNLEADED, REGULAR, AND PREMIUM GRADES OF GASOLINE ARE PROVIDED. THE ANTIKNOCK (OCTANE) INDEX AVERAGES OF GASOLINES SOLD IN THIS COUNTRY WERE 88.5, 89.6, AND 95.0 FOR UN-

LEADED, REGULAR, AND PREMIUM GRADES OF GASOLINES, RESPECTIVELY.

by ELLA MAE SHELTON
DEPARTMENT OF ENERGY, BARTLESVILLE ENERGY
RES. CENTER, BARTLESVILLE, OKLA.
Rept. No. BERC/PPS-78/1; 1978; 93P 5REFS
PREPARED IN COOPERATION WITH AMERICAN
PETROLEUM INST.

Availability: NTIS \$6.00 PAPER COPY, \$3.00 MICROFICHE

HS-022 926

WANTED: HEAT-RESISTANT ELASTOMERS [AUTOMOTIVE APPLICATIONS]

WAYS IN WHICH ELASTOMER SPECIALISTS HAVE RESPONDED TO THE HIGHER AUTOMOTIVE TEMPERATURES UNDERHOOD AND MORE AGGRESSIVE FUELS AND LUBRICANTS ARE OUTLINED. HEAT-RESISTANT ELASTOMERS ARE BEING STRETCHED TO THE LIMIT BY CURRENT TRENDS IN AUTOMOTIVE DESIGN. SUBOPTIMAL IGNITION TIMING, DOWNSTREAM EXHAUST TREATMENT, AND VEHICLE DOWNSIZING HAVE ALL CONTRIBUTED TO HIGHER UNDERHOOD TEMPERATURES (120° C IN MANY CURRENT CARS VS. 80° C OF 1963) AND CATALYTIC CONVERTERS HAVE CONTRIBUTED TO INCREASED UNDERBODY TEMPERATURES ALL CAUSING HEAT AGING OF ELASTOMERS. UNLEADED FUELS WITH HIGH AROMATIC CONTENT AFFECT AN ELASTOMER'S RETENTION OF CONVENTIONAL ANTIOXIDANTS. IN THE EARLY 1970'S TWO SIGNIFICANT ADVANCES OCCURRED IN HEAT-RESISTANT NBR (COPOLYMER OF ACRYLONITRILE AND BUTADIENE). ONE INVOLVED THE USE OF RAW POLYMER STABILIZERS THAT DID NOT INTERFERE WITH ANTIOXIDANTS ADDED TO THE COMPOUND. THE OTHER WAS THE DEVELOPMENT OF ANTIOXIDANTS BOUND INTO THE POLYMER ITSELF AND FIRST OFFERED IN 1974. THESE NEW-GENERATION NBR'S OFFER IMPROVED HEAT RESISTANCE WITH NO SUBSTANTIAL COST PENALTY. ETHYLENE/ACRYLIC (E/A), ANOTHER NEW OPTION, SHOWS GOOD RESISTANCE TO LUBRICANTS, ATF (AUTOMATIC TRANSMISSION FLUID), POWER STEERING FLUIDS, AND COOLANTS. ONE OF ITS STRONG SUITS APPEARS TO BE VIBRATION CONTROL. LIQUID SILICONE ELASTOMER (LSR) COATINGS HAVE GOOD ELECTRICAL PROPERTIES, EVEN AT TEMPERATURES EXCEEDING 250° C. FLUOROCARBONS ARE THE HEAT-RESISTANT AND OIL-RESISTANT SPECIALISTS, BUT ARE AMONG THE MOST COSTLY OF ELASTOMERS. ONLY RECENT GENERATIONS OF FLUOROCARBON MATERIALS SHOW LOW-TEMPERATURE FLEXIBILITY COMPARABLE TO OTHER ELASTOMERS KNOWN FOR THIS PROPERTY. IN GENERAL, COMPOUNDING AND ADDITIVE PACKAGES HAVE TO BE ASSESSED CAREFULLY IN ANY MATERIAL SELECTION. IN SOME CASES, A LESS IMPRESSIVE BASE POLYMER, PROPERLY COMPOUNDED, MAY BE A BETTER CHOICE THAN A "HIGH-PERFORMANCE" ALTERNATIVE BASE. ON THE OTHER HAND, THE COST OF THE ADDITIVE PACKAGE COULD DESTROY ANY FINISHED-COST ADVANTAGE OF A LESS EXPENSIVE BASE MATERIAL. DESIGN REFINEMENTS ALSO PLAY IMPORTANT ROLES IN EXPLOITING ELASTOMER TECHNOLOGY.

SOMETIMES REDESIGN OR RELOCATION OF A PART WILL RENDER IT IMMUNE TO HIGHER TEMPERATURE, WITH NO CHANGE IN MATERIAL REQUIRED. DUAL-ELASTOMER DESIGN USING A COMBINATION OF A HEAT-RESISTANT ELASTOMER AND CONVENTIONAL MATERIAL FOR ONE APPLICATION IS A CONSIDERATION FOR SUCH THINGS AS DUAL-WALL HOSES FOR HYDRAULIC LINES.

Publ: AUTOMOTIVE ENGINEERING V86 N1 P50-6 (JAN 1978)

1978; 1REF

BASED ON SAE-770858 "FUTURE REQUIREMENTS FOR HEAT RESISTANT ELASTOMERS FOR UNDERHOOD AUTOMOTIVE APPLICATIONS," BY MACK CARTER, JR.; SAE-770859 "THE REQUIREMENTS FOR HEAT RESISTANT RUBBER IN JAPANESE CARS," BY HIROYUKI AOKI; SAE-770860 "HEAT RESISTANT ELASTOMER APPLICATIONS--SUCCESS AND FAILURE," BY BERT C. VANDERMAR; SAE-770861 "EPDM RUBBER--WHAT IS MAXIMUM SERVICE TEMPERATURE?" BY R. D. ALLEN AND P. D. HINCKLEY; SAE-770862 "COMPARISON OF NBR WITH OTHER OIL RESISTANT RUBBERS FOR AUTOMOTIVE APPLICATIONS," BY J. R. DUNN AND H. A. PFISTERER; SAE-770863 "EXPLORING THE POTENTIAL OF BOUND ANTIOXIDANT NITRILE RUBBER IN AUTOMOTIVE APPLICATIONS," BY JAMES W. HORVATH AND JERRY L. BUSH; SAE-770864 "ETHYLENE/ACRYLIC ELASTOMER FOR DEMANDING AUTOMOTIVE APPLICATIONS," BY W. R. ABELL; SAE-770865 "POLYETHER ELASTOMERS FOR HEAT RESISTANT AUTOMOTIVE APPLICATIONS," BY NORMAN C. MACARTHUR; SAE-770866 "HIGH TEMPERATURE IGNITION CORE FABRICATION USING A LIQUID SILICONE RUBBER," BY GERALD P. KEHRER AND CARL M. MONROE; AND SAE-770867 "VITON: A HIGH PERFORMANCE FLUOROCARBON ELASTOMER FOR USE IN HOSTILE ENVIRONMENTS," BY R. E. KNOX AND A. NERSASIAN, PRESENTED AT PASSENGER CAR MEETING, DETROIT, 29 SEP 1977.

Availability: SEE PUBLICATION

HS-022 927

DYNAMIC BEHAVIOR OF A 140,000 RPM 3 KW TURBO-ALTERNATOR SIMULATOR ON RESILIENTLY MOUNTED BALL BEARINGS

ROTOR DYNAMIC AND LIMITED ENDURANCE TESTS WERE PERFORMED ON RESILIENTLY MOUNTED 10-MM-BORE BALL BEARINGS SUPPORTING A TEST VEHICLE DESIGNED TO DYNAMICALLY SIMULATE A 3 KW TURBO-ALTERNATOR ROTOR OPERATING AT 140,000 RPM. SQUIRREL CAGE AND "O"-RING-TYPE BEARING SUPPORTS WERE EMPLOYED IN TWO SEPARATE TESTS. THE ACCUMULATED TEST TIME WAS 4500 HOURS. UPON COMPLETION OF THE TESTING THE BALL BEARINGS STILL APPEARED TO BE IN EXCELLENT CONDITION. CHECKS OF THE EFFECT OF OIL FLOW ON BEARING OUTER RACE TEMPERATURE INDICATED THAT THE LOWEST TEMPERATURES WERE OBTAINABLE WITH AN OIL FLOW OF 0.1 GPM PER BEARING. THIS QUANTITY OF LUBRICANT FLOW WAS SUPPLIED TO THE BEARINGS IN BOTH ENDURANCE TESTS. PRELIMINARY TESTS HAD DISCLOSED THAT THE OPTIMUM BEARING PRELOAD WAS ABOUT 18 LBS, AND THIS PRELOAD WAS SUBSEQUENTLY EMPLOYED IN THE ENDURANCE TESTS. THE ROTOR OF THE SIMULATED 3 KW TURBO-AL-

TERNATOR PROVED TO BE LESS SENSITIVE TO CHANGES IN THE ROTOR UNBALANCE THAN EXPECTED. ALTHOUGH ORIGINAL RESIDUAL UNBALANCE WAS MAINTAINED WITHIN .0001 TO .0003 OZ-INCHES, PRELIMINARY TESTS INDICATED THAT AN UNBALANCE OF .0013 OZ-IN COULD BE SAFELY SUSTAINED AT 140,000 RPM. SUBSYNCHRONOUS ROTOR EXCITATION AT THE FIRST TWO CRITICAL SPEEDS WAS NOTED. WHEN BOTH CRITICALS ARE EXCITED THE ROTOR WHIRL UNDERGOES SUBSTANTIAL AMPLITUDE MODULATION. WHEN ONLY THE FIRST CRITICAL IS EXCITED THE ROTOR WHIRL APPEARS TO BE A SUMMATION OF THE CRITICAL AND SYNCHRONOUS AMPLITUDES OF EXCITATION. THE SQUIRREL CAGE BEARING SUPPORTS YIELDED MORE STABLE PERFORMANCE THAN THE "O"-RING MOUNTS. REPEATABILITY OF ROTOR BEHAVIOR WITHIN THE CRITICAL SPEED RANGE WAS SUBSTANTIALLY NOT AFFECTED BY TIME. THE "O"-RING SUPPORTED ROTOR DID UNDERGO CHANGES IN BEHAVIOR WITHIN THE CRITICAL SPEED RANGE AS THE TEST CONTINUED. THIS IS MAINLY ATTRIBUTED TO COMPRESSION SET AND "O"-RING SWELL. FURTHER WORK IS RECOMMENDED TO DETERMINE THE ORIGIN OF THE SUBSYNCHRONOUS EXCITATION FORCES, IF STRICT CONTROL OVER THE STABILITY ASPECTS OF HIGH SPEED OPERATION IS TO BE ACHIEVED.

by L. W. WINN; F. D. JORDAN
MECHANICAL TECHNOLOGY INC., APPLIED
TRIBOLOGY SECTION; ARMY MOBILITY EQUIPMENT
RES. AND DEVEL. COMMAND, ELECTRICAL POWER
LAB.
DAAK02-72-C-0043
Rept. No. SAE-770282; 1977; 24P 3REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE
ENGINEERING CONGRESS AND EXPOSITION,
DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 928

TRUCK BRAKES APPLY TANDEM ANTILOCK

INVESTIGATIONS BY THE BENDIX HEAVY VEHICLE SYSTEMS GROUP OF TANDEM ANTILOCK SYSTEMS FOR TRUCK AIR BRAKES ARE REPORTED, AND THE EVOLUTION OF ANTILOCK SYSTEMS FOR TRUCK AIR BRAKES IS DISCUSSED BY BERG MANUFACTURING CO. ENGINEERS. TANDEM ANTILOCK, WHICH MAKES USE OF A SINGLE CONTROLLER FOR A PAIR OF AXLES IN TANDEM LAYOUT, WAS ANALYZED BY BENDIX THROUGH COMPUTER SIMULATION AND ACTUAL VEHICLE TESTS. TWO POPULAR TYPES OF SUSPENSION WERE STUDIED, FOUR-SPRING AND WALKING BEAM, ON A TRACTOR AND NONARTICULATED TRUCK, RESPECTIVELY. RESULTS INDICATE THAT FOUR-SPRING BRAKING BEHAVIOR MAY BE COMPATIBLE WITH SINGLE-AXLE SENSING. HOWEVER, THE WALKING BEAM'S UNIFORM LOADING IN DECELERATION SEEMS TO REQUIRE FOUR-WHEEL SENSING FOR FULL ANTILOCK PROTECTION. IN EITHER CASE, SINGLE CONTROL OF A TANDEM LAYOUT APPEARS COMPATIBLE WITH FEDERAL MOTOR VEHICLE SAFETY STANDARD (FMVSS) 121'S ANTILOCK REQUIREMENT. COMPLIANCE REQUIRES LOCKUP-FREE BRAKING FROM 60 MPH WITHIN 293

FT. IN INITIAL CONSERVATIVE DESIGNS, EACH AXLE HAS ITS OWN SERVICE RESERVOIR, WITH A SOLENOID-RELAY VALVE CONTROLLING AIR CHAMBER PRESSURE FOR THAT AXLE'S BRAKES. EACH WHEEL HAS A SENSOR, AND THIS SENSOR PAIR FEEDS INFORMATION TO A SEPARATE ANTILOCK COMPUTER FOR EACH AXLE. IN OPERATION, INCIPIENT LOCKUP OF ANY WHEEL WOULD BE FOLLOWED BY REDUCTION OF THAT AXLE'S AIR BRAKE PRESSURE. THE LATTER WOULD BE ALLOWED TO INCREASE, ONCE WHEELS ON THAT AXLE RESUMED NORMAL ROTATION. BERG MANUFACTURING CO. ENGINEERS HAVE EXAMINED TWO BASIC VARIATIONS ON THE ANTILOCK THEME, AXLE-BY-AXLE AND TANDEM CONTROL, WITH RESPECT TO MEETING THE FMVSS 121 REQUIREMENT; AND THEY HAVE ALSO STUDIED THE INTERACTION THAT HAS EVOLVED BETWEEN GOVERNMENT (NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION (NHTSA)) AND INDUSTRY REGARDING TANDEM CONTROL. STOPPING DISTANCES, RELIABILITY, FAILURE MODES, AND WHAT CONSTITUTED A "CONTROLLED LOCKUP" WERE AMONG THE ISSUES IN QUESTION. CONTROLLED LOCKUP WAS, AND REMAINS, SOMETHING OF A GRAY AREA IN THE STANDARD. IN FEB 1976 BERG MANUFACTURING CO. SUBMITTED A SIMPLIFIED SINGLE-AXLE-SENSED TANDEM SYSTEM TO NHTSA FOR VERIFICATION OF COMPLIANCE. IT IS FELT THAT NOW THAT INITIAL STAGES OF 121 ENGINEERING HAVE BEEN COMPLETED, TRENDS ARE EXPECTED IN STANDARDIZING COMPONENTS, IMPROVING ELECTRICAL SYSTEMS, AND INTEGRATING THESE SUBSYSTEMS INTO THE VEHICLE. STANDARDIZATION OF ANTILOCK COMPONENTS WOULD OFFER ECONOMIES OF MASS PRODUCTION, SIMPLIFIED MAINTENANCE, AND REDUCED INVENTORIES. ANTILOCK COMPUTERS WOULD ALSO PROFIT FROM COMMONALITY.

Publ: AUTOMOTIVE ENGINEERING V86 N1 P38-43 (JAN 1978)

1978
BASED ON SAE-770661 "EVOLUTION OF THE TRAILER AIR BRAKE SYSTEM UNDER THE EFFECT OF FMVSS 121," BY ROBERT CRAIL AND BEN KLIMEK; AND SAE-770662 "TANDEM ANTILOCK SYSTEMS FOR AIR BRAKED VEHICLES," BY P. J. O'KEEFE AND M. L. HUTCHINS, BOTH PRESENTED AT INTERNATIONAL WEST COAST MEETING, VANCOUVER, 8-11 AUG 1977.
Availability: SEE PUBLICATION

HS-022 929

"UNIQUE COOLING" APPROACH MAKES ALUMINUM HEADS COST-EFFECTIVE [INTERNAL COMBUSTION ENGINE CYLINDER HEADS]

FORD ENGINEERS HAVE INTRODUCED A DESIGN WHICH SOLVES MANY OF THE PROBLEMS OF USING ALUMINUM ALLOYS INSTEAD OF CAST IRON FOR INTERNAL COMBUSTION (IC) ENGINE CYLINDER HEADS. THIS WAS MADE POSSIBLE BY A COOLING SYSTEM WHICH CONTROLS OPERATING TEMPERATURES IN ALL VITAL AREAS WITHOUT USING A SAND-CORED WATER JACKET PASSAGE. ELIMINATION OF THESE AND OTHER CORES, AND THE USE OF LESS COOLANT, PROVIDE SUBSTANTIAL COST SAVINGS OVER CONVENTIONAL ALUMINUM HEADS.

IN A 5 L, V-8 ENGINE DESIGN USING AN IRON CYLINDER BLOCK AND ALUMINUM ALLOY HEADS, THE "UNIQUE COOLING" SYSTEM DESIGN HAS WEIGHT AND COST ADVANTAGES OVER THE CONVENTIONAL SYSTEM. DUE TO ITS STRUCTURE AND MANUFACTURING PROCESS, A UNIQUE COOLED CYLINDER HEAD IS APPROXIMATELY 0.7 KG LIGHTER THAN A CONVENTIONAL ALUMINUM HEAD. THERE IS 1.4 KG LESS COOLANT IN EACH HEAD BECAUSE OF THE REDUCED COOLANT PASSAGES. THE IRON BLOCK, BECAUSE OF ITS STRUCTURE AND MANUFACTURING PROCESS, IS 4.1 KG LIGHTER IN THE CYLINDER BARREL AND WATER JACKET WALL. IT CONTAINS 1.8 KG LESS COOLANT, AS WELL. THE UNIQUE COOLED HEAD DESIGN REDUCES THE MATERIAL COST OF EACH UNIT BY \$0.80 VIA WEIGHT REDUCTION, AND SAVES ROUGHLY \$1.00 BY LOWERING THE VOLUME OF GLYCOL SOLUTION NEEDED. ALSO IMPORTANT IS THE REDUCTION IN CORE, LABOR, AND SCRAP COST. A REVIEW OF UNIQUE COOLING WITH RESPECT TO 5 L, V-8 ENGINE TESTS, ANALYTICAL TEMPERATURE SURVEY, LABORATORY FLOW ANALYSIS, ENGINE TEMPERATURE AND HEAT BALANCE TESTS, BLOCK STRUCTURE AND HEAD GASKET SEALING, OCTANE FLEET TESTS, AND WOT (WIDE OPEN THROTTLE) DURABILITY TESTS, IS INCLUDED.

Publ: AUTOMOTIVE ENGINEERING V86 N1 P32-7 (JAN 1978)

1978; 2REFS

BASED ON SAE-770832, "A UNIQUE COOLING APPROACH MAKES ALUMINUM ALLOY CYLINDER HEADS COST EFFECTIVE," BY ROBERT P. ERNEST, PRESENTED AT PASSENGER CAR MEETING, DETROIT, 26-29 SEP 1977.

Availability: SEE PUBLICATION

HS-022 930

ALCOHOLISM AND THE COURTS: EXPERIENCE WITH A TRAFFIC SAFETY PROJECT

A FEDERALLY FUNDED ALCOHOL SAFETY ACTION PROJ. (ASAP) IN HARRIS COUNTY, TEX. THAT ATTEMPTED TO CHANGE THE DRINKING BEHAVIOR OF INDIVIDUALS ARRESTED FOR DRIVING WHILE INTOXICATED (DWI) IS DESCRIBED. THE PROJECT WAS ONE OF MORE THAN 35 AROUND THE NATION DESIGNED TO DEAL WITH THE PROBLEM OF THE DRINKING DRIVER; UNLIKE MANY OTHERS, ITS PRIMARY EMPHASIS WAS ON REHABILITATION. PROBATIONERS WHO WERE ASSIGNED TO THE PROJECT BY THE COURTS ENTERED A REHABILITATIVE PROGRAM OF BROAD SCOPE AND VARIED RESOURCES. REHABILITATION REPRESENTED THE MAJOR COMMITMENT OF THE PROJECT IN TIME, MONEY, AND PERSONNEL AND WAS DIRECTED BY A TEAM OF PSYCHIATRISTS AND SPECIALIZED COUNSELORS FROM BAYLOR COLLEGE OF MEDICINE. THE APPROACH TO REHABILITATION RESTED ON THREE FUNDAMENTAL PREMISES. FIRST, DIAGNOSTIC EVALUATION MUST BE BASED ON PERSONAL CONTACT BY A TEAM OF EXPERIENCED PROFESSIONALS; SCREENING TESTS ALONE ARE UNRELIABLE. SECOND, EFFECTIVE TREATMENT IS LONG-TERM AND REQUIRES CLOSE MONITORING OF CHANGING NEEDS AND MOTIVATIONS. AND, THIRD,

TREATMENT MUST BE MULTIMODAL; A VARIETY OF APPROACHES TO REHABILITATION FROM WHICH TO DESIGN A PROGRAM SUITABLE TO EACH CLIENT'S NEEDS MUST BE AVAILABLE. THE PROJECT FUNCTIONED AS A SELF-SUPPORTED ANCILLARY AGENCY TO THE PROBATION DEPARTMENT; HOWEVER, BECAUSE OF PROBLEMS IN COORDINATION WITH THE LEGAL SYSTEM, IT HAD ACCESS TO ONLY ABOUT A FOURTH OF THE DWI OFFENDERS. DESPITE THAT DRAWBACK, AND THE INABILITY TO PROVE THE VALUE OF THE PROJECTS BY THE FEDERAL EVALUATION CRITERIA INITIALLY SET, IT IS BELIEVED THAT THE EXPERIENCE IN TEXAS HAS DEMONSTRATED THE ADVANTAGES OF COMBINING THE EFFORTS OF THE JUDICIAL AND HEALTH-CARE SYSTEMS TO DEAL WITH ALCOHOL ABUSE.

by K. D. CHARALAMPOUS; THELMA JEAN SKINNER
Publ: HOSPITAL AND COMMUNITY PSYCHIATRY V28
N1 P33-5 (JAN 1977)

1977; 3REFS

Availability: SEE PUBLICATION

HS-022 931

TODAY'S VIEW OF THE ALUMINUM AUTOMOTIVE RADIATOR

AFTER MANY YEARS OF RESEARCH AND DEVELOPMENT, INCLUDING NUMEROUS LARGE-SCALE FIELD TESTS, THE ALUMINUM RADIATOR IS FINDING A PLACE IN THE EUROPEAN MARKET. PAST EFFORTS, WHAT IS HAPPENING TODAY (PARTICULARLY OPTIONS WHICH ARE AVAILABLE TO THE MANUFACTURER IN SELECTING A RADIATOR DESIGN AND A JOINING PROCESS TO MEET IMMEDIATE AND LONG-RANGE OBJECTIVES), AND SOME EVALUATIONS FOR THE FUTURE ARE PRESENTED. COST AND PRODUCT RELIABILITY ARE THE PRIMARY CONSIDERATIONS IN ANY NEW PRODUCT OR PRODUCTION CHANGE. HOWEVER, INCREASING EMPHASIS IS BEING PLACED ON LONG-RANGE GOALS CONSISTENT WITH NATIONAL POLICY ON ENERGY CONSERVATION AND ELIMINATION OF WATER AND AIR POLLUTION. CONSEQUENTLY, LOW PRODUCT WEIGHT AND FLUXLESS JOINING HAVE MOVED INTO THE PRIORITY COLUMN FOR RADIATOR CONSTRUCTION. ADVANCES IN ALUMINUM JOINING HAVE CONCENTRATED ON POLLUTION-FREE PROCESSES. THIS FACTOR, COUPLED WITH THE LIGHTWEIGHT METAL, NEW MATERIAL ADVANCES AND ALUMINUM'S RELATIVE PRICE STABILITY, HAVE ADVANCED THE ALUMINUM RADIATOR TO ITS HIGHEST POINT OF INTEREST AND USE IN ITS LONG EFFORT FOR MARKET ACCEPTANCE. HOWEVER, THERE ARE STILL SCENARIOS AND AREAS OF CONCERN TO WHICH FURTHER ANSWERS OR TECHNICAL ADVANCES ARE NEEDED. CONVENTIONAL DESIGNS AND MATERIALS WILL CONTINUE AS STRONG, RELIABLE AND PROVEN PRODUCTS, BUT SUBJECT TO THE CONSTANT COST EVALUATIONS AND COMPARISONS OF TOTAL ALTERNATIVE PACKAGES. IT WILL BE A COMPETITIVE SITUATION SUBJECT TO BOTH SHORT-RANGE AND LONG-RANGE PRICE AND AVAILABILITY TRENDS. IT WILL ALSO BE SUBJECT TO FURTHER DESIGN INNOVATIONS TOWARD MORE EFFICIENT MATERIAL USES THROUGH GAUGE REDUCTION, ETC. RELATED

DESIGN CHANGES AND TECHNICAL ADVANCES IN THE TOTAL COOLING SYSTEM WILL ALSO INFLUENCE FUTURE RADIATOR MATERIAL SELECTIONS. SUCH ITEMS AS MORE ALUMINUM USED IN ENGINE BLOCKS AND HEADS, IMPROVED CORROSION INHIBITORS, CLOSED LOW MAINTENANCE COOLING SYSTEMS, ADVANCES IN ALUMINUM REPAIR PROCEDURES, LOW COOLANT LEVEL INDICATORS, AND POSSIBLE CORROSION SENSOR DEVICES ALL WILL BE INFLUENCING FACTORS IN DECIDING RADIATOR MATERIALS OF THE FUTURE.

by DAVID A. KAECHLE; HARRY K. HERR
REYNOLDS ALUMINUM INC.
Rept. No. SAE-770830; 1977; 18P 3REFS
PRESENTED AT PASSENGER CAR MEETING,
DETROIT, 26-30 SEP 1977.
Availability: SAE

HS-022 932

DESIGNING MOBILE HYDRAULIC PIPING SYSTEMS FOR MAINTAINABILITY

THE FOLLOWING ASPECTS OF DESIGNING HYDRAULIC PIPING SYSTEMS ARE CONSIDERED SEPARATELY: METAL TUBES; HOSES AND COUPLINGS; MANIFOLDS, CONNECTORS AND VALVES; SUCTION LINES; SWIVEL JOINTS; SEALS; FASTENERS; TAPS (PRESSURE, FLOW, TEMPERATURE); PROTECTION OF PIPING; AND SAFETY. DESIGN CONSIDERATIONS THAT ARE CONDUCTIVE TO GETTING A MACHINE BACK INTO OPERATION IN THE MINIMUM AMOUNT OF TIME AND WITH A MINIMUM AMOUNT OF EFFORT INCLUDE THE FOLLOWING: KEEPING PIPING PART NUMBERS TO A MINIMUM FOR A MACHINE OR MACHINE FAMILY, BEST ACCESS TO LEAST RELIABLE PARTS, ABILITY TO ASSEMBLE AND DISASSEMBLE WITH STANDARD HAND TOOLS, WRENCH CLEARANCE, FASTENER TIGHTENING TORQUE REQUIREMENTS, AND EASE OF ADAPTING ANALYTICAL EQUIPMENT TO REDUCE TROUBLESHOOTING TIME.

by R. LENICH
CATERPILLAR TRACTOR CO.
Rept. No. SAE-770618; 1977; 15P 1REF
PRESENTED AT MISSISSIPPI VALLEY SECTION
MEETING, MOLINE, ILL., 28 APR 1977.
Availability: SAE

HS-022 933

SURVEY OF EXCITATION TECHNIQUES APPLICABLE TO THE TESTING OF AUTOMOTIVE STRUCTURES

WITH THE IMPLEMENTATION OF DIGITAL SIGNAL PROCESSING, FREQUENCY RESPONSE MEASUREMENTS ARE NOT LIMITED TO SWEEP SINE TESTING. WITH THE DISCRETE FOURIER TRANSFORM, ANY PHYSICALLY REALIZABLE SIGNAL CAN BE USED FOR EXCITATION. THE BEST TECHNIQUE DEPENDS ON THE APPLICATION, AVAILABLE EQUIPMENT, THE PRESENCE OF MEASUREMENT NOISE, THE LINEARITY OF THE TEST OBJECT, AND THE TIME AVAILABLE IN WHICH TO EXECUTE THE TEST. IN

GENERAL, THE MOST USEFUL TECHNIQUES AT THE PRESENT TIME ARE IMPACT TESTING, PURE RANDOM, AND PERIODIC RANDOM. PURE RANDOM IS THE MOST USEFUL EXCITATION TECHNIQUE. IT DOES A VERY GOOD JOB ON NONLINEAR SYSTEMS (MOST REAL SYSTEMS HAVING APPRECIABLE NONLINEARITIES), AND IS FASTER THAN THE OTHERS IN MODERATE SIGNAL-TO-NOISE SITUATIONS. IT DOES EXHIBIT DISTORTION IF THE FREQUENCY RESOLUTION IS TOO LARGE, BUT THIS CAN BE CIRCUMVENTED BY USING A ZOOM TRANSFORM. THE PERIODIC RANDOM SIGNAL IS SLOWER, BUT IT DOES NOT HAVE THE FREQUENCY RESOLUTION PROBLEMS, AND GIVES THE BEST POSSIBLE RESULT FOR A SPECIFIC CHOICE OF THE BANDWIDTH OF THE MEASUREMENT. IMPACT TESTING IS VERY IMPORTANT BECAUSE OF THE TREMENDOUS SIMPLICITY OF THE EXCITATION PROCESS. AS A RESULT OF THIS IT IS THE BEST EXCITATION TECHNIQUE FOR A "QUICK-LOOK," OR FOR MANY TROUBLESHOOTING APPLICATIONS. IN SUMMARY, ANY EXCITATION TECHNIQUE CAN BE USED FOR MEASURING FREQUENCY RESPONSE, BUT FOR MOST APPLICATIONS THE PURE RANDOM, PERIODIC RANDOM, OR IMPACT TESTING IS THE BEST.

by D. BROWN; G. CARBON; K. RAMSEY
UNIVERSITY OF CINCINNATI; HEWLETT PACKARD CORP.
Rept. No. SAE-770029; 1977; 18P 5REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE
ENGINEERING CONGRESS AND EXPOSITION,
DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 934

INSPECTION/MAINTENANCE: COST-EFFECTIVENESS AND FEASIBILITY OF IMPLEMENTATION

THE COST/EFFECTIVENESS AND FEASIBILITY OF IMPLEMENTATION OF STATE INSPECTION/MAINTENANCE (I/M) PROGRAMS AS A STRATEGY FOR REDUCING HYDROCARBONS (HC) IN CARS WITHOUT CATALYTIC CONVERTERS WERE ANALYZED BASED ON CASE STUDIES OF I/M PROGRAMS BEING IMPLEMENTED IN SEVERAL STATES. THE FOLLOWING FACTORS INFLUENCING THE EFFECTIVENESS OF I/M PROGRAMS WERE IDENTIFIED AND ANALYZED: INTERNAL FACTORS (TYPE OF INSPECTION USED, FAILURE CRITERIA FOR INSPECTIONS, FREQUENCY OF INSPECTIONS, AND PROGRAM IDIOSYNCRASIES) AND EXTERNAL FACTORS (QUALITY OF INSPECTION-MANDATED MAINTENANCE, TAMPERING, EXTRA VOLUNTARY MAINTENANCE PERFORMED BY THE PUBLIC, DETERIORATION RATES, MANUFACTURING DESIGN AND PRODUCTION PRACTICES, AND RELATIONSHIP OF SHORT TEST RESULTS TO FTP (FEDERAL TEST PROCEDURE) TEST RESULTS). THE FOLLOWING PRINCIPAL PROGRAM CHARACTERISTICS WHICH AFFECT THE COST OF AN I/M PROGRAM WERE ANALYZED: ORGANIZATIONAL STRUCTURE (CENTRALIZED OR DECENTRALIZED; PUBLICLY OR PRIVATELY OPERATED), TEST TYPE (EMISSIONS ONLY, OR EMISSIONS AND SAFETY), TEST MODE (IDLE OR LOADED), AND GEOGRAPHIC LOCATION

(NORTHEAST, NORTH CENTRAL, SOUTH, WEST). WITH RESPECT TO AN I/M PROGRAM'S VIABILITY, THE FOLLOWING CRITICAL FACTORS WERE CONSIDERED: WHETHER THE ENVIRONMENTAL PROTECTION AGENCY (EPA) HAS THE AUTHORITY TO REQUIRE I/M PROGRAMS, THE LACK OF TECHNICAL DATA ON AUTO PERFORMANCE AND EMISSIONS, THE PUBLIC'S WILLINGNESS TO ACCEPT THE PROGRAM, AND STATE GOVERNMENT'S CAPACITY TO PAY FOR IMPLEMENTING THE PROGRAM. THE COST-EFFECTIVENESS ANALYSES SUGGEST THAT MANDATORY I/M OF LIGHT-DUTY VEHICLES CAN REDUCE THEIR TAILPIPE HC EMISSIONS BY AT LEAST 8%-15%; FOR CONTROLLED PRECATALYST VEHICLES A BEST ESTIMATE IS 14%-27%. COSTS, AND IN PARTICULAR TRANSACTION COSTS, CAN BE KEPT TO A MINIMUM BY USE OF A FEE-FINANCED SYSTEM OF MANDATORY INSPECTION. OF KEY CONCERN TO PROGRAM SUCCESS IS PUBLIC ACCEPTABILITY. THIS IS ESPECIALLY TRUE IN LIGHT OF THE HIGH VISIBILITY AND CONTROVERSIAL NATURE OF REGULATION OF THE USE OF THE AUTOMOBILE. HIGH REPAIR COSTS, INFREQUENTLY NOTED IN THE CASE STUDY ANALYSIS, COUPLED WITH PUBLIC DISTRUST OF THE AUTO REPAIR INDUSTRY, POSE SERIOUS CHALLENGES TO SUCCESSFUL IMPLEMENTATION. STATE OWNED AND OPERATED FACILITIES, ALTHOUGH AFFORDING THE MOST SATISFACTORY FORM OF CONSUMER PROTECTION, SUFFER FROM CHRONIC LONG-TERM STATE BUDGETARY RESTRAINTS. IN MANY CASES, THESE RESTRAINTS ARE CRUCIAL, IF NOT DETERMINING, TO PROGRAM INCEPTION AND CONTINUATION.

by EDWARD J. BENTZ, JR.; SANDRA J. BODMER-TURNER; BARRY KORB; WILLIAM P. WHITE, 3RD. ENVIRONMENTAL PROTECTION AGENCY, LONG RANGE PLANNING GROUP, 401 M ST., S.W., WASHINGTON, D.C. 20460
Rept. No. PB-274 078; 1977; 121P 83REFS
Availability: NTIS

HS-022 935

DETERMINATION OF EXHAUST EMISSIONS FROM 1971 MODEL VEHICLES

A DESCRIPTION AND RESULTS OF A PROGRAM TO ACQUIRE EXHAUST EMISSION DATA ON 1971 MODEL YEAR CARS FOR USE BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA) ARE PRESENTED. TESTS WERE CONDUCTED ON 250 VEHICLES IN DETROIT, MICH., DURING THE PERIOD 5 MAR 1971 THROUGH 17 APR 1971 TO ACQUIRE EMISSION DATA THAT WERE REQUIRED TO IMPLEMENT PROVISIONS OF RECENT LEGISLATION (THE CLEAN AIR ACT). THE PROGRAM INVOLVED TESTING OF A CROSS SECTION OF PROJECTED PRODUCTION OF 1971 VEHICLES BY THE 1971 FTP (FEDERAL TEST PROCEDURE) TO ESTABLISH A NITROGEN OXIDES (NOX) EMISSION BASELINE. MEASUREMENT OF NOX WAS ACCOMPLISHED UTILIZING A CHEMILUMINESCENCE INSTRUMENT WHICH WAS CONSTRUCTED FOR THE STUDY. MEASUREMENTS WERE MADE OF CARBON MONOXIDE (CO), CARBON DIOXIDE (CO₂), HYDROCARBONS (HC), AND NOX EMISSIONS ON A MASS EQUIVALENT BASIS (GRAMS

PER MILE). RESULTS ARE PRESENTED IN TABULAR FORM.

by H. J. WIMETTE
OLSON LABS., INC., 22805 MICHIGAN AVE.,
DEARBORN, MICH. 48124
EPA-68-04-0003
Rept. No. PB-267 759; 1971?; 31P 4REFS
Availability: NTIS

HS-022 936

DYNAMOMETER DISTANCE

CALCULATION OF MASS EMISSIONS AND FUEL ECONOMY WAS MADE USING DATA ACQUIRED BY FEDERAL TEST PROCEDURES. THE CURRENT MEANS OF CALCULATING MASS EMISSIONS IN GRAMS PER MILE ASSUMES THAT THE DISTANCE TRAVELED DURING THE FEDERAL TEST CYCLE IS 7.5 MILES WITH THE CURRENT TOLERANCES ON THE FTP (FEDERAL TEST PROCEDURE) DRIVING TRACE, THE TOTAL DISTANCE TRAVELED DURING A TEST MAY BE SIGNIFICANTLY HIGHER OR LOWER THAN 7.5 MILES. FUEL ECONOMY IS NOW ALSO BEING CALCULATED, AND IT IS ALSO BASED ON 7.5 MILES TRAVELED. IT IS RECOMMENDED THAT THE TOTAL DISTANCE TRAVELED ON THE DYNAMOMETER BE MEASURED AND THAT THE DISTANCES TRAVELED DURING EACH PHASE OF THE URBAN DYNAMOMETER DRIVING SCHEDULE EXHAUST TEST BE USED TO CALCULATE THE MASS EMISSIONS. IN ADDITION THE TOTAL DISTANCE TRAVELED DURING THE HWY. FUEL ECONOMY TEST SHOULD BE MEASURED AND USED IN THE CALCULATION OF FUEL ECONOMY. IN ORDER TO IMPLEMENT THE USE OF THE MEASURED DISTANCE TRAVELED, A MEANS OF MEASURING THAT DISTANCE AND APPROPRIATE CHANGES (TECHNICAL AMENDMENTS) TO THE FEDERAL REGISTER ARE REQUIRED. THE DISTANCE MEASUREMENT DEVICE SHOULD BE ABLE TO DELIVER AN ACCURACY OF PLUS OR MINUS 0.5% AND IT SHOULD BE CAPABLE OF GIVING SEPARATE MEASUREMENTS OF DISTANCE FOR THE SEPARATE PHASES OF THE TEST CYCLE. THE FOLLOWING TWO CHANGES IN THE FEDERAL REGISTER WOULD BE REQUIRED: MAKE A PROVISION IN PARAGRAPH 85.075-22 FOR RECORDING THE DISTANCE TRAVELED DURING COLD TRANSIENT, STABILIZED, AND HOT TRANSIENT PHASES OF THE TEST; AND CHANGE THE CURRENT METHOD OF CALCULATION (SECTION 85.075-26 (A)). CHANGES IN THE CALCULATION ARE PRESENTED. THE HWY. FUEL ECONOMY TEST AS DESCRIBED IN THE FEDERAL REGISTER COULD BE MODIFIED BY MERELY REQUIRING THE MASS EMISSIONS OF HYDROCARBON, CARBON MONOXIDE, AND CARBON DIOXIDE, IN GRAMS, TO BE DIVIDED BY THE MEASURED DISTANCE INSTEAD OF THE NOMINAL 10.242 MILE DISTANCE.

by THOMAS RARICK
ENVIRONMENTAL PROTECTION AGENCY, STANDARD DEVEL. AND SUPPORT BRANCH, ANN ARBOR, MICH. 48105
Rept. No. PB-270 852; LDTP-75-1; 1975; 9P 5REFS
TECHNICAL SUPPORT REPT. FOR REGULATORY ACTION.
Availability: NTIS

October 31, 1978

HS-022 939

HS-022 937

COST OF OWNING AND OPERATING AN AUTOMOBILE 1976

FACTORS INFLUENCING THE COSTS OF CAR OWNERSHIP AND OPERATION ARE EXAMINED, AND WAYS THE MOTORIST CAN GET THE BEST VALUE FOR HIS/HER MONEY ARE SUGGESTED. THE OWNERSHIP COSTS INCLUDE DEPRECIATION, INSURANCE COSTS, FINANCE CHARGES, REGISTRATION AND TITLING OR SALES TAXES, ACCESSORY COSTS, AND GARAGE COSTS. THE OPERATING COSTS INCLUDE GASOLINE AND OIL; TIRES; REPAIRS AND MAINTENANCE; GARAGING, PARKING AND TOLLS; AND TAXES ON GASOLINE AND OIL. A TABLE IS PRESENTED WHICH PROVIDES BASES FOR ESTIMATES OF AUTOMOBILE OPERATING COSTS FOR 1976 MODEL YEAR VEHICLES (STANDARD SIZE, COMPACT, AND SUBCOMPACT) ACCORDING TO TYPICAL OPERATIONS IN THE BALTIMORE, MD., SUBURBS. A WORKSHEET IS PROVIDED THAT CAN BE USED AS A GUIDE TO ADJUSTING THE STUDY COSTS TO ANY OTHER LOCALITY FOR WHICH COST FACTORS CAN BE OBTAINED. THE ESTIMATED COSTS OF OPERATING THE THREE SIZES OF 1976 MODEL AUTOMOBILES IN THE BALTIMORE AREA ARE TABULATED. IN SUMMARY, DURING THE FIRST YEAR OF OPERATION THE THREE STUDY CARS WOULD HAVE DAILY OWNING AND OPERATING COSTS OF \$7.44 (STANDARD SIZE), \$4.83 (COMPACT), AND \$3.95 (SUBCOMPACT). WITH EACH YEAR THE DAILY COSTS DROP, AND DIFFERENCES IN THESE COSTS BETWEEN CAR SIZES NARROW AS THE YEARS PASS. BY THE TIME EACH OF THE CARS HAS ACCUMULATED NEARLY 60,000 MILES, THE DAILY COSTS ARE RELATIVELY CLOSE. THEY REMAIN CLOSE FOR THE NEXT 25,000 MILES OF TRAVEL. SOME WAYS TO SAVE ON COSTS INCLUDE THE FOLLOWING: USE RADIAL TIRES INSTEAD OF BIAS PLY TIRES, JOIN A CARPOOL, SHOP FOR MONEY TO FINANCE THE CAR PURCHASE, KEEP THE CAR PROPERLY TUNED, GET INSURANCE SUITED TO PARTICULAR USE PATTERNS, SHOP AMONG CAR DEALERS IF A SAVING CAN BE ACHIEVED AND NOT OFFSET BY EXCESSIVE TRAVEL TO OBTAIN WARRANTY SERVICE, SAVE FUEL BY BUYING A SMALL CAR (WITHOUT POWER-ROBBERING FEATURES), READ CAREFULLY THE NEW CAR WARRANTY AND FULLY UTILIZE EVERY PROMISED SERVICE, AND MAKE MINOR REPAIRS AND REPLACEMENTS INSTEAD OF PAYING A MECHANIC.

by L. L. LISTON; C. A. AIKEN
FEDERAL HWY. ADMINISTRATION, VEHICLES,
DRIVERS, AND FUELS BRANCH
1977; 15P
Availability: CORPORATE AUTHOR

HS-022 938

TRANSPORTATION ENERGY CONSUMPTION AND CONSERVATION POLICY OPTIONS IN THE NORTHEAST

A PROFILE IS PRESENTED OF 1972 TRANSPORTATION ENERGY CONSUMPTION IN THE NORTHEAST REGION OF THE U.S. TRANSPORTATION ENERGY PROJECTIONS FOR THE REGION ARE GIVEN BY MODE FOR

THE YEARS 1985 AND 2000. CONSERVATION ACTIONS WHICH COULD SIGNIFICANTLY AFFECT FUTURE TRANSPORTATION ENERGY DEMAND LEVELS ARE DESCRIBED AND THEIR IMPACTS EVALUATED. IT IS ESTIMATED THAT WHILE THE DEMAND FOR ENERGY IN THE TRANSPORTATION SECTOR MIGHT INCREASE BY AS MUCH AS 88% BY THE YEAR 2000, STRONG CONSERVATION ACTIONS COULD REDUCE THE PROJECTED LEVEL OF DEMAND BY OVER 30%. AMONG THE CONSERVATION MEASURES SUGGESTED ARE SPEED REDUCTION FOR MOTOR VEHICLES, AIRCRAFT, AND MARITIME VESSELS; INCREASED LOAD FACTORS FOR TRUCKS AND AIRCRAFT; COMMUTER CAR POOLING; PROMOTION OF INTERMODALISM (E.G. RAILROAD PIGGYBACKING); AND PUBLIC TRANSIT INCENTIVES, SUCH AS LOWER FARES, EXPANDED SERVICE, COMMUTER PARKING TAX, AND FUEL TAXES. SUBSTITUTING HIGH-SPEED SURFACE TRANSPORT FOR SHORT DISTANCE AIR TRAVEL IS ALSO SUGGESTED AS AN APPLICATION OF NEW TECHNOLOGY, WHICH INCLUDES MAXIMUM REFINEMENT OF THE INTERNAL COMBUSTION ENGINE, THE USE OF ELECTRICITY FOR RAILROADS AND PASSENGER CARS, AND NUCLEAR PROPULSION FOR MARITIME COMMERCE. OTHER STRATEGIES ARE ENERGY-EFFICIENT PATTERNS FOR NEW SUBURBAN DEVELOPMENT, AND CONCENTRATION OF INDUSTRIAL-COMMERCIAL ACTIVITIES. RECENT CHANGES IN THE GROWTH AND DISTRIBUTION PATTERNS OF POPULATION AND OF INDUSTRIAL AND COMMERCIAL ACTIVITIES ARE REVIEWED. THE FACTORS AFFECTING THESE PATTERNS AND THE IMPLICATION OF CHANGING PATTERNS ON ENERGY USE FOR TRANSPORTATION ARE DISCUSSED. IT IS SHOWN THAT LAND-USE CONTROLS COULD SUBSTANTIALLY REDUCE THE GROWTH OF TRANSPORTATION ENERGY DEMAND. CONSERVATION ACTIONS ARE DISCUSSED WITHIN THE CONTEXT OF HOW THEY MIGHT BE IMPLEMENTED BY FEDERAL, STATE, OR LOCAL GOVERNMENTS. INTERACTIONS BETWEEN ACTIONS ARE DISCUSSED AND GROUPINGS OF ACTIONS THAT MINIMIZE THE DISADVANTAGES OF INDIVIDUAL ACTIONS WHILE TAKING ADVANTAGE OF COMPLEMENTARY EFFECTS BETWEEN ACTIONS ARE PRESENTED.

SYSTEMS DESIGN CONCEPTS, INC., 9 RECTOR ST.,
NEW YORK, N.Y. 10006
ERDA-E(30-1)-16
Rept. No. BNL-50554; 1976; 165P 98REFS
NORTHEAST ENERGY PERSPECTIVES STUDY BY
BROOKHAVEN NATIONAL LAB., UPTON, N.Y. 11973
Availability: NTIS \$6.75 PAPER, \$3.00 MICROFICHE

HS-022 939

EVALUATION OF ROADWAY GUIDE SIGNS AT A LARGE AIRPORT [CANADA]

A STUDY OF THE GUIDE SIGNS TO MAJOR DESTINATIONS AT TORONTO INTERNATIONAL AIRPORT (ONT., CANADA) LED TO MORE EFFECTIVE SIGNS WHICH IMPROVED TRAFFIC FLOW AND FACILITATED ROAD SELECTION. COMPARISON OF RESULTS OF LABORATORY AND FIELD TECHNIQUES CONFIRMED THE VALIDITY OF THE LABORATORY METHODS OF SIGN EVALUATION. INCLUDED IN THE

ANALYZED DATA WERE REACTION TIME AND GLANCE LEGIBILITY. IMPROVEMENTS IN THE GUIDE SIGNS INCLUDED ELIMINATION OF UNNECESSARY INFORMATION AND REPLACEMENT OF DOWN ARROWS WITH LARGER DIRECTIONAL ARROWS. SHAPE CODING WAS USED IN TWO INSTANCES.

by ROBERT E. DEWAR; JERRY G. ELLS; PETER J. COOPER
 Publ: TRANSPORTATION ENGINEERING P19-23 (JUN 1977)
 1977; 8REFS
 Availability: SEE PUBLICATION

HS-022 940

INJURY CONTROL

THE CAUSES OF HUMAN INJURY ARE OUTLINED, WITH APPROPRIATE PREVENTIVE STRATEGIES. THESE CAUSES INCLUDE ABNORMAL ENERGY TRANSFERS OR INTERFERENCE WITH ENERGY TRANSFER. MECHANICAL ENERGY IS THE MAIN AGENT IN FRACTURES, LACERATIONS, ABRASIONS, AND CONTUSIONS. THERMAL, CHEMICAL, OR ELECTRICAL ENERGY AND IONIZING RADIATION ARE RESPONSIBLE FOR BURNS, WITH POISONING, ELECTROCUTION, AND RADIATION DAMAGE AS SPECIFIC INJURY FOR THE LAST THREE AGENTS. OTHER FACTORS INTERFERE WITH NORMAL BODY ENERGY EXCHANGES: OXYGEN UTILIZATION IN DROWNING AND CARBON MONOXIDE POISONING, AND THERMOREGULATION IN FREEZING. THE FUNDAMENTAL TASKS IN INJURY CONTROL ARE TO PREVENT AGENTS FROM REACHING PEOPLE IN AMOUNTS OR AT RATES EXCEEDING INJURY THRESHOLDS, AND TO MINIMIZE THE CONSEQUENCES OF INJURY. PRIORITY AND EMPHASIS SHOULD BE GIVEN TO MEASURES THAT WILL MOST EFFECTIVELY REDUCE INJURY LOSSES. A "MIXED STRATEGY" SHOULD USUALLY BE EMPLOYED, WITH COUNTERMEASURES FOR PREVENTING POTENTIALLY INJURIOUS EVENTS, FOR REDUCING THE CHANCE OF INJURY, AND FOR REDUCING THE UNNECESSARY CONSEQUENCES OF INJURY. PREFERENCE SHOULD BE GIVEN TO "PASSIVE" MEASURES (E.G. AIRBAGS). ECONOMIC CONSIDERATIONS SHOULD LEAD TO THE CHOICE OF COUNTERMEASURES OF PROVEN EFFECTIVENESS. AMONG THE HUMAN FACTORS INVOLVED IN INJURY CONTROL ARE HUMAN BEHAVIOR, HUMAN ENGINEERING, THE EFFECT OF ALCOHOL AND OTHER DRUGS, AND MEDICAL CONDITIONS. SPECIAL HIGH-RISK GROUPS ARE IDENTIFIED: CHILDREN (INCLUDING ABUSE BY PARENTS), TEENAGERS, AND THE AGED. INJURY-RELATED ENVIRONMENTS ARE CLASSIFIED AS TRANSPORTATION, MANUFACTURED PRODUCTS, THE HOME, RECREATION, AND WORK.

by WILLIAM HADDON, JR.; SUSAN P. BAKER
 INSURANCE INST. FOR HWY. SAFETY, WATERGATE 600, SUITE 300, WASHINGTON, D.C. 20037; JOHNS HOPKINS UNIV. SCHOOL OF HYGIENE AND PUBLIC HEALTH, BALTIMORE, MD.
 1978; 69P 134REFS
 Availability: INSURANCE INST. FOR HWY. SAFETY, WATERGATE 600, SUITE 300, WASHINGTON, D.C. 20037

HS-022 941

THE PEDESTRIAN AS A ROAD USER. THE MAIN POINTS OF A NUMBER OF SWOV REPORTS

AN OVERVIEW IS PRESENTED OF PEDESTRIAN SAFETY AS RELATED TO EXPOSURE, THE NATURE AND SEVERITY OF ACCIDENTS, AND ANALYSIS OF PEDESTRIAN CASUALTIES BY SEX, AGE, ACCIDENT LOCATION, TIME OF DAY AND YEAR, WEATHER CONDITIONS, TYPE OF COLLIDING VEHICLE, AND VEHICLE MANEUVER. OTHER FACTORS ARE INCLUDED, SUCH AS THE INFLUENCE OF DRINKING, SOCIAL FACTORS, THE SPEED OF APPROACHING VEHICLES, AND VISIBILITY OF AND TO THE PEDESTRIAN. POSSIBILITIES OF IMPROVING PEDESTRIAN SAFETY ARE ASSESSED, SUCH AS ZEBRA CROSSINGS, SIGNAL AND PUSH-BUTTON CONTROLLED CROSSINGS, AND FOOTBRIDGES AND SUBWAYS FOR PEDESTRIANS AND CYCLISTS. LAW ENFORCEMENT MEASURES ARE DISCUSSED, AS ARE INITIATIVES IN GUIDANCE, TRAINING, INFORMATION, AND PUBLICITY CAMPAIGNS. POSSIBLE PEDESTRIAN SAFETY STRATEGIES IN URBAN PLANNING ARE RECOMMENDED. IT APPEARS THAT IT WILL BE IMPOSSIBLE TO AVOID POTENTIAL CONFLICTS BETWEEN PEDESTRIANS AND WHEELED TRAFFIC WITHOUT DRASTIC ACTION. THE MEASURES AIMED AT ADAPTING LOCALITIES TO ROAD USERS' ABILITIES AND LIMITATIONS ARE LIKELY TO HAVE MORE SHORT-TERM AND LONG-TERM INFLUENCE ON BEHAVIOR THAN GUIDANCE, TRAINING, INFORMATION, AND PUBLICITY. THE PRINCIPLE APPLIED TO PEDESTRIAN SAFETY IN THE NETHERLANDS INVOLVES TRAFFIC INTEGRATION, WITH THE AID OF DIFFERENT DESIGNS FOR PAVEMENTS, STREETS, AND CAR PARKS, AND OF PHYSICAL OBSTACLES TO REDUCE PEDESTRIAN/DRIVER CONFLICTS. SWOV'S TASK IS TO EVALUATE THE EFFECT OF NEW DESIGNS FOR ROAD SAFETY.

by J. H. KRAAY, COMP.
 INSTITUTE FOR ROAD SAFETY RES. SWOV, P.O. BOX 71, VOORBURG 2119, THE NETHERLANDS
 Rept. No. SWOV-1977-1E; 1977; 26P 20REFS
 Availability: CORPORATE AUTHOR

HS-022 942

DRINKING BY MOTORISTS. REPORT AND RESULTS OF ROADSIDE SURVEYS INTO DRINKING AND DRIVING OF DUTCH MOTORISTS DURING WEEKEND NIGHTS IN AUTUMN 1970, 1971, 1973, 1974, AND 1975

DRINKING HABITS BY DUTCH MOTORISTS DURING WEEKEND NIGHTS IN AUTUMN WERE SURVEYED BEFORE AND AFTER THE INTRODUCTION OF NEW LEGISLATION IN NOV 1974. BLOOD ALCOHOL VALUES WERE DERIVED FROM BLOOD SAMPLES AND FROM ONE OR TWO BREATH ANALYSES. THE NUMBER AND PERCENTAGE OF THOSE WHO REFUSED TO COLLABORATE IN THE TESTS DECREASED MARKEDLY AFTER 1974. RESULTS INDICATE THAT DRINKING BY DRIVERS INCREASED BETWEEN 1970 AND 1973; THE 1975 DRINKING LEVEL WAS SLIGHTLY BELOW THAT OF 1970. RESULTS ARE

TABULATED BY TIME OF DAY AND WEEK, SEX, AND REGIONAL AREA AND SIZE OF MUNICIPALITY.

by P. C. NOORDZIJ; A. A. VIS; J. A. G. MULDER
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71, VOORBURG 2119, THE NETHERLANDS
Rept. No. SWOV-1977-2E; 1977; 71P 4REFS
Availability: CORPORATE AUTHOR

HS-022 943

DRIVERS USE OF SEAT BELTS AS A FUNCTION OF ATTITUDE AND ANXIETY

OF 278 QUESTIONNAIRES CONCERNING SEATBELT USE DISTRIBUTED IN SHEFFIELD AND BIRMINGHAM, ENGLAND, IN 1974, 215 WERE USED IN THIS ANALYSIS. DRIVERS WEARING A SEAT BELT WERE GIVEN ONE FORM OF QUESTIONNAIRE; NON-SEATBELT USERS WERE GIVEN A DIFFERENT FORM. THE TWO FORMS DIFFERED ONLY IN TWO WORDS ON THE FRONT PAGE. RESULTS INDICATED THAT DRIVERS' REPORTED AND ACTUAL USE OF SEATBELTS ARE PREDICTABLE FROM THEIR OPINIONS ABOUT THE COMFORT AND EFFECTIVENESS OF SEATBELTS. THESE RELATIONSHIPS ARE MODIFIED BY ANXIETY ABOUT POSSIBLE ACCIDENTS. LOW-ANXIETY DRIVERS EXHIBIT A STRONGER ASSOCIATION BETWEEN ATTITUDE AND BEHAVIOR THAN DO HIGH-ANXIETY DRIVERS.

by STEPHEN ASHTON; PETER WARR
Publ: BRITISH JOURNAL OF SOCIAL AND CLINICAL
PSYCHOLOGY N15 P261-5 (1976)
1976; 8REFS
Availability: SEE PUBLICATION

HS-022 944

A CONTROLLED STUDY OF THE ROLE OF ALCOHOL IN FATAL ADULT PEDESTRIAN ACCIDENTS

DATA WERE COLLECTED ON ALL ADULT PEDESTRIAN FATALITIES WHICH OCCURRED IN THE WEST MIDLANDS, ENGLAND, METROPOLITAN AREA FROM JAN 1969 THROUGH 31 DEC 1975. FROM CORONERS' RECORDS, BLOOD ALCOHOL CONCENTRATIONS (BAC'S) WERE OBTAINED FOR THOSE PEDESTRIANS WHO DIED WITHIN 12 HOURS OF THE ACCIDENT. OTHER RELEVANT DATA WERE COLLECTED FROM POLICE FILES. CONTROL DATA WERE OBTAINED FROM ROADSIDE INTERVIEWING OF PEDESTRIANS (MATCHED FOR SEX) PASSING THE ACCIDENT SITE AT THE TIME OF DAY, DAY OF WEEK, AND TIME OF YEAR AS THE OCCURRENCE OF THE ACCIDENT. FROM THESE INTERVIEWS, BIOGRAPHICAL DATA AND DRINKING HABITS WERE OBTAINED TOGETHER WITH BAC MEASURES (USING AN ALCOLMETER). A COMPARISON OF THE BAC DISTRIBUTION OF 344 FATALLY INJURED PEDESTRIANS WITH THAT OF A MATCHED GROUP OF 1118 NONACCIDENT-INVOLVED PEDESTRIANS SHOWED THE INCREASED RISK OF PEDESTRIAN FATAL ACCIDENT INVOLVEMENT ASSOCIATED WITH A BAC EQUAL OR GREATER THAN 120 MG/100ML. THESE IMPAIRED PEDESTRIANS COMPRISED 27% OF MALE AND 7% OF FEMALE PEDESTRI-

ANS WHO DIED WITHIN 12 HOURS OF THE ACCIDENT. AMONG MALES, IMPAIRMENT APPEARED TO BE OVERREPRESENTED AMONGST THE 15-64 YEARS AGE GROUP, UNMARRIED, DIVORCED, AND SEPARATED PERSONS, AND THE SEMISKILLED AND UNSKILLED WORKERS. ROUTINE BAC DETERMINATION FOR ALL ADULT PEDESTRIANS ADMITTED TO HOSPITAL FOLLOWING A TRAFFIC ACCIDENT IS SUGGESTED AS AN ESSENTIAL FIRST STEP IN THE DETECTION AND TREATMENT OF ALCOHOL-DEPENDENT INDIVIDUALS.

by A. B. CLAYTON; A. C. BOOTH; P. E. MCCARTHY
UNIVERSITY OF BIRMINGHAM, ACCIDENT RES. UNIT,
ENGLAND
Rept. No. TRRL-SR-332; 1977; 25P 12REFS
Availability: TRANSPORT AND ROAD RES. LAB.,
CROWTHORNE, BERKS., ENGLAND

HS-022 945

MOTORCYCLE MAINTENANCE AND TEST INTERVALS

MAINTENANCE AND REPAIR DATA FROM THE GAL-LUP MOTORCYCLE SURVEY WERE ANALYZED AND TEST INTERVALS DETERMINED FOR EMISSION AND DURABILITY VEHICLES (EVERY 1500 KM FOR CYCLES UNDER 170CC, EVERY 5000 KM FOR LARGER VEHICLES). THE ANALYSES WERE PERFORMED ON ORIGINAL-OWNER, STREET AND DUAL-PURPOSE MOTORCYCLES WITH WORKING ODOMETERS. THE GAL-LUP SURVEY QUESTIONNAIRE PROVIDED DATA ON HOW OFTEN SPARK PLUGS WERE CHANGED, ENGINES TUNED UP, VALVES ADJUSTED OR CYLINDER HEADS DECARBONIZED, AND CARBURETORS CLEANED OR DISASSEMBLED. THE QUESTIONNAIRE ALSO ASKED AT WHAT MILEAGE WERE VARIOUS MAJOR REPAIRS FIRST PERFORMED: PISTONS AND RINGS, VALVES, BEARINGS, AND CARBURETOR REPLACEMENT OR REBUILDING. THE MAJOR ENGINE REPAIR DATA WERE ANALYZED AND SCHEDULED MAINTENANCE INTERVALS (3000 KM FOR CYCLES UNDER 170 CC, 4000 KM FOR LARGER VEHICLES) AND TYPE OF ALLOWABLE MAINTENANCE WERE RECOMMENDED FOR THE DURABILITY VEHICLE. CYLINDER HEAD DECARBONIZATION WAS NOT RECOMMENDED AS SCHEDULED MAINTENANCE.

ENVIRONMENTAL PROTECTION AGENCY,
STANDARDS DEVEL. AND SUPPORT BRANCH, ANN
ARBOR, MICH.
Rept. No. MC-75-05; PB-270 866; 1975; 13P
TECHNICAL SUPPORT REPT. FOR REGULATORY
ACTION.
Availability: NTIS

HS-022 946

REACTION TIME AS AN INDEX OF TRAFFIC SIGN PERCEPTION

VERBAL REACTION TIMES TO IDENTIFY AND TO CLASSIFY 20 TRAFFIC SIGN MESSAGES WERE MEASURED UNDER THREE CONDITIONS: SIGN ALONE, SIGN PLUS VISUAL LOADING TASK, AND SIGN PLUS VISUAL LOADING TASK PLUS VISUAL DISTRACTION.

SIMILAR TRENDS WERE FOUND IN THE THREE EXPERIMENTS: REACTION TIMES WERE SMALLER FOR THE CLASSIFICATION TASK THAN FOR THE IDENTIFICATION TASK, SMALLER FOR WARNING THAN FOR REGULATORY SIGNS, AND SMALLER FOR VERBAL THAN FOR SYMBOLIC MESSAGES. COMPARISON OF THESE REACTION TIME DATA WITH ON-THE-ROAD MEASURES OF LEGIBILITY DISTANCE REVEALED SIGNIFICANT CORRELATIONS. THE CORRELATIONAL DATA ADD CREDIBILITY TO LABORATORY MEASURES OF REACTION TIMES AS VALID INDICES OF TRAFFIC SIGN PERCEPTION.

by ROBERT E. DEWAR; JERRY G. ELLS; GLEN MUNDY
CMT-98541
Publ: HUMAN FACTORS V18 N4 P381-92 (1976)
1976; 6REFS
Availability: SEE PUBLICATION

HS-022 947

THE SEMANTIC DIFFERENTIAL AS AN INDEX OF TRAFFIC SIGN PERCEPTION AND COMPREHENSION

THE SEMANTIC DIFFERENTIAL (A PAPER-AND-PENCIL TEST WHICH MEASURES PSYCHOLOGICAL MEANING) WAS EXAMINED AS A POTENTIAL INSTRUMENT FOR EVALUATION OF TRAFFIC SIGN MESSAGES. TWO EXPERIMENTS ARE DESCRIBED, ONE RELATING SEMANTIC DIFFERENTIAL SCORES TO COMPREHENSION AND THE OTHER RELATING THIS INDEX TO GLANCE LEGIBILITY. THE DATA INDICATE THAT SEMANTIC DIFFERENTIAL SCORES ON ALL FOUR FACTORS (EVALUATIVE, ACTIVITY, POTENCY, AND UNDERSTANDABILITY) WERE HIGHLY CORRELATED WITH COMPREHENSION OF SYMBOLIC MESSAGES. THESE SCORES WERE UNRELATED TO GLANCE LEGIBILITY OF VERBAL MESSAGES, BUT TWO FACTORS (EVALUATIVE AND UNDERSTANDABILITY) DID CORRELATE WITH GLANCE LEGIBILITY OF SYMBOLIC MESSAGES. IT WAS CONCLUDED THAT THE SEMANTIC DIFFERENTIAL IS A VALID INSTRUMENT FOR EVALUATING COMPREHENSION OF SYMBOLIC SIGN MESSAGES AND THAT IT HAS ADVANTAGES OVER OTHER TECHNIQUES.

by ROBERT E. DEWAR; JERRY G. ELLS
CMT-97096
Publ: HUMAN FACTORS V19 N2 P183-9 (1977)
1977; 8REFS
Availability: SEE PUBLICATION

HS-022 948

THE SLASH OBSCURES THE SYMBOL ON PROHIBITIVE TRAFFIC SIGNS

THE PROBLEM OF WHETHER DRIVERS SHOULD BE TOLD WHAT THEY CAN DO (PERMISSIVE MESSAGE) OR WHAT THEY CANNOT DO (PROHIBITIVE MESSAGE) IS DISCUSSED AS IT RELATES TO TRAFFIC SIGN SYMBOLS. A WIDELY USED VERSION OF THE PROHIBITIVE MESSAGE (SYMBOL SURROUNDED BY A RED RING WITH A SLASH THROUGH THE SYMBOL) WAS FOUND TO HAVE LIMITED LEGIBILITY

BECAUSE THE SLASH OBSCURES THE SYMBOL. TWO EXPERIMENTS EXAMINED THE GLANCE LEGIBILITY OF 15 SYMBOLS UNDER EACH OF FOUR CONDITIONS: SLASH OVER SYMBOL, SLASH UNDER SYMBOL, PARTIAL SLASH, AND NO SLASH. THE RESULTS INDICATED THAT THE GLANCE LEGIBILITY OF TRAFFIC SIGN SYMBOLS IS BETTER WHEN NO SLASH OR A PARTIAL SLASH IS USED TO CONVEY THE PROHIBITIVE MESSAGE. ONE PROBLEM WITH OMITTING THE SLASH IS THAT COLOR-BLIND PEOPLE ARE UNABLE TO USE THE RED CIRCLE AS A CUE THAT THE MESSAGE IS PROHIBITIVE; A PARTIAL SLASH MAY THEREFORE BE THE BEST COMPROMISE.

by ROBERT E. DEWAR
APA-0141
Publ: HUMAN FACTORS V18 N3 P253-8 (1976)
1976; 8REFS
Availability: SEE PUBLICATION

HS-022 949

VEHICLE WARRANTIES: GREATER EFFICIENCY FOR GOVERNMENT BY USING COMMERCIAL PRACTICES

SIGNIFICANT SAVINGS TO THE GOVERNMENT CAN BE REALIZED BY IMPROVEMENT IN THE USE OF VEHICLE WARRANTIES. A STANDARD BILLBACK AGREEMENT IN ARMY COMMERCIAL VEHICLE CONTRACTS ALLOWED THE GOVERNMENT TO MAKE WARRANTED REPAIRS AND TO OBTAIN REIMBURSEMENT FROM THE MANUFACTURER. GOVERNMENT AGENCIES HAVE NOT BEEN FULLY APPRISED OF THESE OPPORTUNITIES FOR MAXIMUM WARRANTY UTILIZATION. SAVINGS OF \$1.5 MILLION TO \$2 MILLION ANNUALLY HAVE BEEN ESTIMATED BY THE U.S. POSTAL SERVICE IN USING BILLBACK AGREEMENTS. ADDITIONAL SAVINGS ARE POSSIBLE IF THE GOVERNMENT SIMPLIFIES ITS WARRANTY PROCEDURES TO CONFORM TO COMMERCIAL PRACTICES, SUCH AS THE USE OF A LIMITED WARRANTY REGISTRATION CARD. THE GENERAL ACCOUNTING OFFICE RECOMMENDS THAT AN EFFECTIVE COMMUNICATION SYSTEM BE DEVELOPED TO PROVIDE COMPLETE, ACCURATE, AND TIMELY WARRANTY INFORMATION TO USING ACTIVITIES, AND THAT THE ADVANTAGES OF BILLBACK AGREEMENTS BE PUBLICIZED.

GENERAL ACCOUNTING OFFICE, WASHINGTON, D.C.
20548
Rept. No. PSAD-78-53; PB-275 325; 1977; 23P
Availability: NTIS

HS-022 950

COMPUTER-BASED RESOURCE ACCOUNTING MODEL FOR GENERATING AGGREGATE RESOURCE IMPACTS OF ALTERNATIVE AUTOMOBILE TECHNOLOGIES. VOL. 1. FLEET ATTRIBUTES MODEL. FINAL REPORT

A COMPUTER-BASED MODEL WAS DEVELOPED FOR GENERATING THE RESOURCE REQUIREMENTS OF ALTERNATIVE AUTOMOBILE TECHNOLOGIES. THE

October 31, 1978

HS-022 953

MODEL GOES BEYOND PREVIOUS TOOLS IN ITS SCOPE, LEVEL OF IMPACT DISAGGREGATION, AND FLEXIBILITY TO PROJECT THE ANNUAL ENERGY, MATERIAL, CAPITAL, AND LABOR REQUIREMENTS OF THE PASSENGER-AUTOMOBILE FLEET THROUGH THE YEAR 2000. THE METHODOLOGY INTEGRATES A FAMILY-TREE TECHNIQUE FOR MATERIAL AND ENERGY ACCOUNTING, WITH AN INPUT-OUTPUT APPROACH WHICH GENERATES THE CAPITAL AND LABOR INFORMATION. TWENTY-FOUR MAJOR MATERIALS ARE TRACKED, WITH SUPPLY DISAGGREGATED AMONG PRIMARY AND RECYCLED MATERIALS, IMPORTS, AND DOMESTIC SOURCES. NET ENERGY CONSUMPTION IS DERIVED, ALONG WITH CAPITAL AND LABOR IMPACTS DISAGGREGATED BY 90 INDUSTRIES. THE RESOURCE ACCOUNTING METHODOLOGY IS DESCRIBED, WITH EMPHASIS ON THE FLEET ATTRIBUTES MODEL. REPRESENTATIVE SCENARIOS ARE PRESENTED.

by BRUCE RUBINGER; SIMON PRENSKY
TRANSPORTATION SYSTEMS CENTER, KENDALL
SQUARE, CAMBRIDGE, MASS. 02142
Rept. No. DOT-TSC-OST-77-72; 1978; 55P 22REFS
REPT. FOR JUL-NOV. 1977.
Availability: NTIS

HS-022 952

HIGHWAY SAFETY ATTITUDES OF VIRGINIANS. RESULTS OF THE 1977 HIGHWAY SAFETY PUBLIC OPINION POLL. FINAL REPORT

APPROXIMATELY 1700 RANDOMLY SELECTED VIRGINIA FAMILIES WERE CALLED IN AN OCT 1977 OPINION POLL, IN WHICH EACH MEMBER OF THE HOUSEHOLD OVER 16 YEARS OF AGE WAS ASKED FOR AN OPINION ON VARIOUS HIGHWAY SAFETY ISSUES. THE TOPICS INCLUDED RIGHT TURN ON RED, LEFT TURN ON RED, THE 55 MPH SPEED LIMIT, ALCOHOL COUNTERMEASURES AND THE MINIMUM LEGAL DRINKING AGE, DRIVER LICENSING (MINIMUM AGE), ACTIVE AND PASSIVE RESTRAINTS, PERIODIC MOTOR VEHICLE INSPECTION, AND MOTORCYCLE HELMET LEGISLATION. THE FINDINGS INDICATED THAT NONE OF THE ANTICIPATED PROBLEMS OF RIGHT TURN ON RED HAVE AROUSED PUBLIC CONCERN. FEW VIRGINIANS WERE AWARE THAT A LEFT TURN ON RED IS PERMITTED. A MAJORITY (79%) WERE IN FAVOR OF THE 55 MPH SPEED LIMIT, WHICH MAY EXPLAIN WHY VIRGINIA HAS THE LOWEST RATE OF SPEED LIMIT VIOLATIONS IN THE COUNTRY. OPINIONS ON MOST OF THE OTHER ISSUES WERE MORE EVENLY DIVIDED. ONLY 38% FAVORED MANDATORY SEATBELT LEGISLATION, AND 62% SAID THAT THEY WOULD BUY AIR BAGS IF THE COST WAS LESS THAN \$200. OVER 90% OF ALL RESPONDENTS FELT THAT MOTORCYCLISTS SHOULD BE REQUIRED BY LAW TO WEAR HELMETS.

by CHERYL LYNN
VIRGINIA HWY. AND TRANSPORTATION RES.
COUNCIL, CHARLOTTESVILLE, VA.
Rept. No. VHTRC-78-R46; 1978; 50P
Availability: CORPORATE AUTHOR

HS-022 953

DIESELS AND MAN. ARE WE CREATING A NEW ENVIRONMENTAL PROBLEM BY SOLVING AN OLD ONE?

DIESEL ENGINES OFFER A 25% TO 30% FUEL ECONOMY IMPROVEMENT WHILE MEETING FEDERAL REGULATIONS ON EMISSIONS. A GROWING BODY OF EVIDENCE SUGGESTS, HOWEVER, THAT THE WIDESPREAD USE OF DIESEL ENGINES COULD GENERATE ENOUGH CARCINOGENS TO SERIOUSLY THREATEN PUBLIC HEALTH. DIESELS EMIT FAR MORE NITROGEN DIOXIDE THAN GASOLINE ENGINES, AND FROM 50 TO 80 TIMES THE PARTICULATES. PARTICULATES ARE COMPOSED OF POLYCYCLIC ORGANIC MATTER (POM); POLYNUCLEAR AROMATIC HYDROCARBONS (PAH) AND THEIR DERIVATIVES; HETEROCYCLIC AROMATIC DERIVATIVES SUCH AS AZA-ARENE COMPOUNDS; INDOLES; AND CARBAZOLES. PAH IS A CLASS CONTAINING CARCINOGENS SUCH AS BENZO(A)PYRENE (BAP). PARTICULATES REMAIN SUSPENDED IN THE AIR FOR UP TO 40 DAYS, DURING WHICH PAH PARTICLES CAN REACT WITH OTHER POLLUTANTS AND CHANGE INTO NEW CARCINOGENS. SUBSTANCES IN DIESEL FUMES ARE SUBJECT TO A WIDE VARIETY OF CHEMICAL REACTIONS PRODUCING AIRBORNE ACIDS AND CARCINOGENIC CHEMICALS SUCH AS NITROSAMINES, SULFONATES, AND SULFONIC ACIDS. THE AMES TEST HAS BEEN DEVELOPED AS A SCREENING PROCEDURE FOR MEASURING THE MUTAGENICITY OF CHEMICALS ON COLONIES OF *SALMONELLA* BACTERIA. NEVERTHELESS, VERY LITTLE IS KNOWN ABOUT THE CARCINOGENICITY OF DIESEL PARTICLES IN THE ATMOSPHERE, OR ABOUT WHAT HAPPENS TO DIESEL PARTICLES IN THE LUNGS, THE GASTROINTESTINAL TRACT, OR THE LYMPHATIC SYSTEM. THE POSSIBLE HEALTH EFFECTS OF DIESEL ENGINE EXHAUST SHOULD BE EXAMINED BEFORE TOO MUCH TOOLING AND DESIGN EFFORT IS COMMITTED TO INCREASING THE DIESEL POPULATION. THERE ARE ESSENTIALLY TWO WAYS TO REDUCE THE PUBLIC HEALTH RISK OF DIESEL EMISSIONS: BY REGULATING THE NUMBER OF DIESELS, OR BY REGULATING EMISSIONS. CONTROL DEVICES USED IN MINE DIESELS INCLUDE CATALYTIC CONVERTERS AND WATER SCRUBBERS. ANOTHER APPROACH USES A SPIRAL FILTER TRAP. ONE PROBLEM IS THAT CATALYTIC OXIDATION OF POM MAY SUBSTANTIALLY INCREASE THE PERCENTAGE OF EXHAUST SULFUR DIOXIDE CONVERTED TO SULFATES. ANOTHER PROBLEM IS THAT THESE CONTROLS ARE IN THE EMBRYONIC STAGE OF TECHNOLOGY, AND POSE A THREAT TO COMPETITIVE PRICING OF DIESEL ENGINES.

by BRIAN KETCHAM; STAN PINKWAS
Publ: NEW ENGINEER V7 N4 P23-6, 31-2 (APR 1978)
1978; 15REFS
Availability: SEE PUBLICATION

HS-022 954

PRELIMINARY REPORT ON A COMPUTER SIMULATION OF CAR DRIVING

A COMPUTER MODEL OF CAR DRIVING IS DESCRIBED WHICH WAS DEVELOPED TO ASSESS THE FUEL-SAVING POTENTIAL OF VARIOUS ECONOMY MEASURES. THE MODEL INCORPORATES DRIVER BEHAVIOR AS A CENTRAL FEATURE AND HAS BEEN DESIGNED FOR EASY VALIDATION AGAINST RESULTS FROM INSTRUMENTED CARS. THE REPORT OUTLINES THE BASIC CONCEPTS OF THE MODEL, PRELIMINARY CALIBRATION AND VALIDATION AGAINST AN INSTRUMENTED FORD ESCORT 1300, AND ALSO SOME INITIAL APPLICATIONS INCLUDING THE FUEL-SAVING POTENTIAL OF A LOWER URBAN SPEED LIMIT, AND OVERALL GEARING MODIFICATION. THE BASIC INPUT VARIABLES ARE OBTAINED FROM THE ROUTE (SPEED LIMITS, STOP POINTS, BENDS, AND HILLS), THE CAR (MASS, FRONTAL AREA, AERODYNAMIC DRAG COEFFICIENT, ROLLING RESISTANCE, INERTIAS, ENGINE FUEL MAP, GEAR RATIOS, AND TRANSMISSION EFFICIENCIES), AND THE DRIVER (DETERMINATION AND ANTICIPATION PARAMETERS, ENGINE SPEEDS, MAXIMUM THROTTLE OPENING, MINIMUM TIME BETWEEN GEAR CHANGES, AND GEAR CHANGE EXECUTION TIME). OUTPUTS ARE IN THREE FORMS: A NUMERICAL PROFILE OF DISTANCE, WEIGHT, SPEED, GEARING, BRAKING FORCE, AND ENGINE PARAMETERS; A GRAPHICAL PRESENTATION AS A SUMMARY OF THE SIMULATED VEHICLE PARAMETERS; AND OVERALL AVERAGES OF SPEED, ENGINE AND LOCOMOTIVE EFFICIENCY, AND FUEL CONSUMPTION.

by P. M. NOWOTNY; E. J. HARDMAN
TRANSPORT AND ROAD RES. LAB., CROWTHORNE,
BERKS., ENGLAND
Rept. No. TRRL-SR-325; 1977; 18P
Availability: CORPORATE AUTHOR

HS-022 955

CHARACTERIZATION OF TIRE EMISSIONS USING AN INDOOR TEST FACILITY

A TEST FACILITY FOR STUDYING TIRE WEAR PRODUCTS IS DESCRIBED, WHICH IS DESIGNED TO CONFINE GASEOUS AND PARTICULATE EMISSIONS, FREE FROM CONTAMINANTS, AND TO PROVIDE A MEANS OF RECOVERING AND SAMPLING THESE EMISSIONS FOR FURTHER ANALYSIS. THE RESULTS OF THE PHYSICAL CHARACTERIZATION OF TIRE WEAR EMISSIONS ARE OUTLINED, AS IS THE CHEMICAL CHARACTERIZATION OF THE LARGE PARTICULATE. A FRAME SECTION AND SUSPENSION ASSEMBLY FROM AN OLDSMOBILE TORONADO WERE USED, WITH MONITORS FOR SPEED, TORQUE, AND TEMPERATURE. SIMULATIONS FOR FRONT AND REAR WHEELS WERE ARRANGED AND MEASUREMENTS WERE MADE OF TIRE TEMPERATURE. SAMPLING MODES INCLUDED DYNAMIC, QUASISTATIC, AND STATIC. THE TESTED TIRES WERE NEW STEEL BELTED RADIALS AND BIAS BELTED TIRES. TIRE WEIGHT LOSS WAS DETERMINED. FIVE TEST MODES WERE USED: HIGH-SPEED FRONT, HIGH-TORQUE REAR, STEER-SLIP, SERIES OF COLD STARTS, AND A

COMBINATION TEST. THE EMISSION RATE OF GASES AND AIRBORNE PARTICULATE MATTER WAS NEARLY INDEPENDENT OF WEAR RATE AND ACCOUNTED FOR 1% TO 20% OF THE TOTAL EMISSIONS. THE BALANCE OF THE EMISSIONS WERE LARGE PARTICLES, CHEMICAL ANALYSIS OF WHICH SHOWED THAT ABOUT 30% OF THE STYRENE BUTADIENE RUBBER (SBR) IS UNVULCANIZED, COMPARED TO 1%-2% OF THE TREAD. THE TOTAL ORGANIC CONTENT OF THE PARTICLES WAS UNCHANGED. THIS DEGRADATION OF THE RUBBER LEADS TO ENHANCED OXYGEN RATES, THE SIGNIFICANCE OF WHICH IS NOT KNOWN.

by R. L. WILLIAMS; S. H. CADLE
Publ: RUBBER CHEMISTRY AND TECHNOLOGY V51 N1
P7-25 (MAR-APR 1978)
1978; 15REFS
PRESENTED AT MEETING OF AMERICAN CHEMICAL SOCIETY, RUBBER DIV., CLEVELAND, 4-7 OCT 1977.
Availability: SEE PUBLICATION

HS-022 956

MEDICAL AID AT THE ROADSIDE

AID GIVEN TO PATIENTS AT THE ROADSIDE MAY BE DIVIDED INTO THREE CATEGORIES: FIRST AID, AMBULANCE AID, AND MEDICAL AID. THE TYPE OF ASSISTANCE ACTUALLY RENDERED BY THE DOCTOR WILL DEPEND UPON HOW WELL HE IS EQUIPPED. ROADSIDE TREATMENT CONCERNS FOUR ASPECTS OF INJURY: HEMORRHAGE, AIRWAY OBSTRUCTION, PAIN, AND FRACTURES; EACH MAY BE MANAGED ON THE LEVELS LISTED ABOVE, DEPENDING ON KNOWLEDGE AND AVAILABILITY OF EQUIPMENT. PROCEDURES FOR THESE LEVELS OF MANAGEMENT ARE OUTLINED, AS ARE PRECAUTIONS AND PROCEDURES TO BE FOLLOWED UPON ARRIVAL AT AN ACCIDENT SCENE. USEFUL BASIC EQUIPMENT TO BE CARRIED IN A DOCTOR'S CAR IS MENTIONED IN CONNECTION WITH THE RECOMMENDED PROCEDURES.

by A. G. MACMAHON
Publ: SOUTH AFRICAN MEDICAL JOURNAL V50 P1948-51 (13 NOV 1976)
1976; 5REFS
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MEDICAL MANAGEMENT OF THE TRAPPED PATIENT

SOME OF THE UNIQUE PROBLEMS ARE DESCRIBED OF ROAD TRAFFIC OR INDUSTRIAL ACCIDENTS IN WHICH PEOPLE ARE TRAPPED AS A RESULT OF THE ACCIDENT. A NEW ASSESSMENT OF PRIORITIES IS NEEDED IN TRAINING FOR DEALING WITH A TRAPPED PATIENT. THE SITUATION MUST BE FIRST ANALYZED TO PREVENT THE RESCUERS FROM ENTERING AN UNSAFE ENVIRONMENT. PROTECTIVE HELMETS MAY BE REQUIRED. THE PATIENT'S CONDITION IS THEN EVALUATED. ABNORMAL BREATHING OR PULSE RATE SHOULD RECEIVE IMMEDIATE ATTENTION, BY INTRAVENOUS THERAPY AND CLEARING OF AN AIRWAY. CALMING OF THE

PATIENT AND ONLOOKERS IS ESSENTIAL. RINGER'S LACTATE IN PLASTIC BAGS IS PREFERRED FOR INTRAVENOUS THERAPY, OBVIATING THE USE OF GLASS CONTAINERS. ASSESSMENT OF THE PATIENT'S INJURIES SHOULD BE RAPIDLY BUT THOROUGHLY MADE, SINCE RESCUE TECHNIQUES DEPEND ON THE PATIENT'S CONDITION. ANALGESIA, BASICALLY PENTAZOCINE AND ENTENOX, SHOULD BE ADMINISTERED FOR PAIN IN CONSERVATIVE DOSAGE; PETHIDINE SHOULD BE AVOIDED. THE METHOD OF EXTRICATION OF THE PATIENT SHOULD BE DISCUSSED WITH ALL RESCUERS, AND EQUIPMENT NECESSARY TO REDUCE FRACTURES SHOULD BE READY AT HAND. SURGERY, TO FREE A TRAPPED PATIENT, SHOULD BE AVOIDED AT ALL COSTS. PRECAUTIONS MUST BE TAKEN AGAINST FIRE WHEN OXYGEN IS ADMINISTERED. A LONG TRAUMA BOARD SHOULD BE READY TO RECEIVE THE FREED PATIENT. TREATMENT MUST BE CONTINUED IN THE AMBULANCE AND THE HOSPITAL MEDICAL OFFICER ADVISED OF TREATMENT PROCEDURES UPON ARRIVAL AT THE HOSPITAL. INDUSTRIAL ACCIDENT VICTIMS ARE TREATED IN MUCH THE SAME MANNER: INTRAVENOUS INFUSION AND ANALGESIC ADMINISTRATION. IN INDUSTRIAL ACCIDENTS, THERE IS GENERALLY A TRAPPED LIMB, WITH THE PATIENT IN A STANDING POSITION. THE PATIENT MUST BE MADE AS COMFORTABLE AS POSSIBLE, MUST BE REASSURED, AND THE TRAPPED LIMB MUST BE SUPPORTED. IF MACHINERY MUST BE REVERSED TO FREE THE PATIENT, HE SHOULD BE ANESTHETIZED BRIEFLY WITH A DRUG SUCH AS KETAMINE, TAKING THE USUAL PRECAUTIONS.

by A. G. MACMAHON
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MODIFICATION OF EVAPORATIVE EMISSION ENCLOSURES TO COMPLY WITH TEMPERATURE LIMITATIONS OF THE 1978 FEDERAL TESTING PROCEDURE

A TEST PROGRAM IS DESCRIBED FOR DEVELOPING A COOLING SYSTEM WHICH WOULD MEET THE FEDERAL EVAPORATIVE EMISSION TEST TEMPERATURE REQUIREMENTS: A RANGE OF 68° F (20° C) TO 86° F (30° C). TEST RESULTS INDICATE THAT INTERNAL COOLING SYSTEMS ARE PREFERABLE TO EXTERNAL COOLING, AND THAT LOCATION OF COOLING SYSTEM COMPONENTS SUBSTANTIALLY AFFECTS THE ENCLOSURE AMBIENT TEMPERATURE AND THE QUANTITY OF HEAT REMOVED. THE MOST EFFECTIVE CONFIGURATION PRODUCED A MAXIMUM INCREASE OF 6° F IN THE ENCLOSURE ABOVE THE SURROUNDING AMBIENT TEMPERATURE. COOLING THE ENCLOSURE WALLS AND INSIDE AIR TO 69° F REDUCED THE PEAK ENCLOSURE TEMPERATURE BY ONLY 1° F. INTERNAL ENCLOSURE COOLING CAN RESULT IN LOWER HOT SOAK EMISSION LEVELS THAN NO ENCLOSURE COOLING, DEPENDING ON THE VEHICLE TESTED. IT IS RECOMMENDED THAT

"MODIFIED OUTLET" INTERNAL COOLING SYSTEMS BE INSTALLED IN ENVIRONMENTAL PROTECTION AGENCY (EPA) CERTIFICATION ENCLOSURES, AND THAT SOME TESTING BE DONE BEFORE THE ENCLOSURES ARE USED FOR CERTIFICATION TESTS. IT IS ALSO RECOMMENDED THAT ENCLOSURE COOLING SYSTEMS BE AS SIMILAR AS POSSIBLE.

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 Rept. No. PB-270 705; EVAP-77-1; 1977; 22P
 TECHNICAL SUPPORT REPT. FOR REGULATORY
 ACTION.
 Availability: NTIS

HS-022 959

MOTORCYCLE TAILPIPE DILUTION CVS [CONSTANT VOLUME SAMPLING] STUDY

A NEW EXHAUST DILUTION SYSTEM RECENTLY DESIGNED AND BUILT FOR USE IN MOTORCYCLE TESTING AT THE ENVIRONMENTAL PROTECTION AGENCY (EPA) WAS EVALUATED FOR WATER CONDENSATION AND ITS ABILITY TO MAINTAIN STATIC PRESSURE VARIATIONS WITHIN PLUS/MINUS 0.25 KPA AS MEASURED AT THE TAILPIPE OF A TEST VEHICLE. THIS EVALUATION STEMMED FROM TWO REQUIREMENTS AS SPECIFIED IN THE MOTORCYCLE REGULATIONS REGARDING THE DILUTION SYSTEM. SECTIONS 86.509 (B)(1) AND (C)(1) STATE THAT THE STATIC PRESSURE VARIATIONS AT THE TAILPIPE OF THE VEHICLE TESTED BY EPA MUST BE CAPABLE OF REMAINING WITHIN PLUS/MINUS 0.25 KPA OF THE STATIC PRESSURE VARIATIONS MEASURED DURING A DYNAMOMETER DRIVING CYCLE WITH NO CONNECTION TO THE TAILPIPE. SECTIONS 86.509 (B)(4) AND (C)(4) STATE THAT THE LOCATION OF THE DILUTION AIR INLET SHALL BE PLACED AND THE FLOW CAPACITY OF THE CONSTANT VOLUME SAMPLER SHALL BE LARGE ENOUGH TO VIRTUALLY ELIMINATE WATER CONDENSATION IN THE SYSTEM. AFTER MULTIPLE RUNS OVER THE URBAN DYNAMOMETER DRIVING SCHEDULE WITH A LARGE DISPLACEMENT MOTORCYCLE, VIRTUALLY NO WATER CONDENSATION WAS OBSERVED IN THE SYSTEM AND THE STATIC PRESSURE VARIATIONS RANGED FROM -0.14 TO -0.13 KPA.

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 ARBOR, MICH.
 Rept. No. PB-270 711; MC-76-09; 1976; 7P
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EFFECT OF DRIVER MASS TOLERANCE ON MOTORCYCLE EMISSIONS AND FUEL ECONOMY

TO DETERMINE THE APPROPRIATENESS OF THE DRIVER MASS TOLERANCE FOR EMISSION TESTING AS SPECIFIED IN SECTION 86.529(C)(1) OF THE MOTOR-

CYCLE REGULATION (PLUS/MINUS 10 KG) PRIOR TO FINAL RULEMAKING, A TEST PROGRAM WAS CONDUCTED TO MEASURE EMISSIONS AND FUEL ECONOMY AT VARIOUS DRIVER MASSES. THE TEST VEHICLE WAS A HONDA CB360 WHICH REPRESENTS A TYPICAL MIDDLE-WEIGHT, FOUR-STROKE MOTOR-CYCLE. NOMINAL DRIVER MASSES OF 60, 70, 80, 90, 100, AND 120 KG WERE TESTED WHERE 80 KG IS THE SPECIFIED NOMINAL DRIVER MASS SETTING. HYDROCARBON, CARBON MONOXIDE AND CARBON DIOXIDE INCREASED WHILE FUEL ECONOMY DECREASED WITH INCREASING DRIVER MASS AND DISPLAYED GOOD CORRELATION. NITROGEN OXIDES DID NOT QUITE SHOW SUFFICIENT CORRELATION ON A COMPOSITE BASIS. AFTER DETERMINING THE RELATIONSHIPS BETWEEN EMISSIONS AND DRIVER MASS, IT WAS NECESSARY TO DETERMINE THE EXTENT TO WHICH DRIVER MASS COULD BE VARIED FROM THE SPECIFIED DRIVER MASS BEFORE SIGNIFICANT DIFFERENCES IN EMISSIONS WOULD BE OBSERVED. TO DO THIS, AN ANALYSIS OF VARIANCE OF EMISSION RESULTS WAS PERFORMED. SIGNIFICANT DIFFERENCES IN EMISSIONS AND FUEL ECONOMY WERE FIRST OBSERVED WHEN THE MASS WAS VARIED PLUS/MINUS 10 KG FROM THE SPECIFIED MASS. BECAUSE A RESTRICTIVE TOLERANCE WOULD EXCLUDE MANY POTENTIAL DRIVERS, AND A BROAD TOLERANCE WILL SIGNIFICANTLY AFFECT EMISSIONS AND FUEL ECONOMY RESULTS, IT IS RECOMMENDED THAT THE DRIVER MASS TOLERANCE BE PLUS/MINUS 10 KG.

HS-022 961

DEVELOPMENT OF THE VOLVO LAMBDA-SOND SYSTEM [EMISSION CONTROL SYSTEM]

THE DEVELOPMENT AND PERFORMANCE, TEST PROCEDURES USED, AND THE POTENTIAL AND LIMITATIONS OF VOLVO'S NEW EMISSION CONTROL SYSTEM, THE VOLVO LAMBDA-SOND SYSTEM, WHICH IS THE FIRST PRODUCTION SYSTEM TO FULLY UTILIZE A THREE-WAY CATALYST, ARE DISCUSSED. THE SYSTEM WAS DEVELOPED FOR VOLVO'S FOUR-CYLINDER IN-LINE B21 ENGINE, AND EMPLOYS AN EXHAUST GAS COMPOSITION SENSOR, AN ADDITIONAL FEEDBACK CONTROL LOOP TO THE CONTINUOUS FUEL INJECTION SYSTEM, AND THE CATALYST. DURING BOTH CERTIFICATION AND INITIAL PRODUCTION THE LAMBDA-SOND SYSTEM HAS DEMONSTRATED THE FOLLOWING ATTRIBUTES: EMISSION LEVELS WELL BELOW THE 1977 CALIFORNIA REQUIREMENTS; FUEL ECONOMY BENEFITS OF APPROXIMATELY 5% TO 12%; EXCELLENT DRIVEABILITY; GOOD FULL-LOAD PERFORMANCE; VEHICLE WEIGHT REDUCTION THROUGH ELIMINATION OF THE AIR INJECTION AND EXHAUST GAS RECIRCULATION SYSTEMS, AUTOMATIC COMPENSATION FOR HIGH ALTITUDE, BAROMETRIC AND TEMPERATURE CHANGES, FUEL SYSTEM WEAR, DRIFT, AND MANU-

FACTURING VARIATIONS; AND A POTENTIAL FOR FURTHER SMALL FUEL ECONOMY AND COST REDUCTION IMPROVEMENTS WHILE STILL MAINTAINING EMISSION LEVELS WITHIN THE 1977 CALIFORNIA REQUIREMENTS. MUCH DEVELOPMENT WORK REMAINS TO BE DONE BEFORE THE TECHNOLOGY CAN BE APPLIED TO AN EXTENDED RANGE OF ENGINES. TO ENSURE THE CORRECT AIR/FUEL (A/F) RATIO, THE SENSOR LOCATION MUST ENABLE THE EXHAUST GASES FROM EVERY CYLINDER TO BE SENSED, AND IT MUST BE CLOSE TO THE ENGINE EXHAUST PORTS TO ENSURE A QUICK SENSOR WARM-UP TO WORKING TEMPERATURE AND TO MINIMIZE THE TOTAL SYSTEM RESPONSE TIME. THESE CRITERIA ARE MET ON THE VOLVO FOUR-CYLINDER ENGINE BUT ARE MUCH MORE DIFFICULT TO MEET ON A V-TYPE ENGINE DUE TO THE EXHAUST SYSTEM LAYOUT.

by GRUNDE T. ENGH; STEPHEN WALLMAN
AKTIEBOLAGET VOLVO, CAR DIV.
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THE EFFECT OF BOUNDARY LAYER CHANGES DUE TO TRANSIENT HEAT TRANSFER ON THE PERFORMANCE OF AN AXIAL-FLOW AIR COMPRESSOR [TURBINES]

A METHOD HAS BEEN DEVELOPED FOR PREDICTING THE EFFECT OF BOUNDARY LAYER CHANGES DUE TO TRANSIENT HEAT TRANSFER ON THE PERFORMANCE OF AN AXIAL-FLOW AIR COMPRESSOR. SURGE IN AN AXIAL-FLOW COMPRESSOR IS INFLUENCED BY THREE-DIMENSIONAL EFFECTS. IDEALLY, SOME FORM OF PREDICTION METHOD BASED ON BLADE-ELEMENT DATA, WITH RADIAL INTEGRATION, FOLLOWED BY AXIAL STACKING, SHOULD BE USED. SUCH A PROCEDURE IS VERY COMPLEX, AND SOME OF THE NECESSARY DATA ARE AS YET INCOMPLETE. IN THE PRESENT EXPLORATORY CALCULATION, IT HAS THEREFORE BEEN DECIDED TO SIMPLIFY THE CALCULATIONS BY ADOPTING A TWO-DIMENSIONAL PROCEDURE BASED ON THE MEAN BLADE HEIGHT. THE AIM OF THE STUDY, NEVERTHELESS, IS TO PREDICT THE CHANGE IN THE CHARACTERISTICS OF THE REAL, THREE-DIMENSIONAL COMPRESSOR RESULTING FROM HEAT TRANSFER. A REASONABLE FIRST METHOD OF THIS EFFECT WILL BE GIVEN BY THE DIFFERENCES BETWEEN THE TWO SETS OF CHARACTERISTICS OF THE COMPRESSOR, AS PREDICTED BY THE TWO-DIMENSIONAL METHOD WITHOUT, AND WITH HEAT TRANSFER. THE METHOD IS ILLUSTRATED BY APPLYING IT TO THE CONDITIONS IN A COMPRESSOR AT THE END OF A RAPID DECELERATION AT 12,200 M (40,000 FT) ALTITUDE FROM MAXIMUM SPEED TO FLIGHT IDLE SPEED, PRIOR TO A POSSIBLE ACCELERATION. THE COMPRESSOR SELECTED IS THE 12-STAGE HIGH PRESSURE COMPRESSOR OF A TYPICAL TWIN-SPOOL AXIAL-FLOW BYPASS ENGINE OF COMPRESSION

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RATIO 20. AS A FIRST ESTIMATE, THE SURGE MARGIN PRIOR TO THE REACCELERATION IS REDUCED BY ABOUT 40% DUE TO BOUNDARY LAYER EFFECTS, AND BY A FURTHER 25% DUE TO "BULK" HEAT TRANSFER.

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Rept. No. SAE-770284; 1977; 11P 17REFS
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DUTY CYCLES FOR TURBINE-POWERED TRAINS

CYCLIC LOADS IMPOSED ON GAS TURBINE ENGINES WHEN USED FOR TRACTION AND APU (AUXILIARY POWER UNIT) OPERATION IN VARIOUS TURBINE-POWERED TRAINS (TMT 4, 5 AND 9 TURBO TRAINS AND GENERAL ELECTRIC GT-E COMMUTER CARS) ARE DISCUSSED, AND METHODS OF OPERATION WHICH WILL REDUCE ENGINE CYCLING TO A MINIMUM IN ORDER TO EXTEND ENGINE OPERATING LIFE ARE SUGGESTED. THE DUTY CYCLES AND OPERATING PARAMETERS OF THE GAS TURBINE ENGINES VARY CONSIDERABLY AND ARE DIRECTLY RELATED TO THE TYPE OF SERVICE THE TRAIN IS REQUIRED TO PROVIDE AND TO THE TYPE OF TRANSMISSION USED. THE DUTY CYCLES ARE FURTHER VARIED BY DIFFERENCES IN THE WAYS DRIVERS OPERATE THE THROTTLES TO ACCELERATE AND TO MAINTAIN THE DESIRED SPEEDS. THE ARRANGEMENT OF ENGINES IN THE TURBO TRAINS IS SUCH THAT TWO OF THE ENGINES PROVIDE POWER FOR APU SERVICE. ONLY ONE OF THESE ENGINES MAY BE OPERATED ON APU SERVICE AT A TIME, THE OTHER ENGINE BEING RESERVED AS STANDBY AND POSSIBLY COUPLED TO THE TRANSMISSION SYSTEM IF SO DESIRED. WHEN OPERATED IN THE APU MODE THESE ENGINES ACCUMULATE RUNNING TIME AT A FASTER RATE THAN THE TRACTION ENGINES AS THEY ARE THE FIRST TO BE STARTED AND THE LAST TO BE SHUT DOWN. THEY ARE OFTEN KEPT OPERATING FOR EXTENDED PERIODS AT TERMINAL STATIONS AND DURING ROUTINE SERVICING OPERATIONS. WHEN IN OPERATION THE LOAD REQUIREMENTS ARE RELATIVELY STABLE FOR LONG PERIODS OF TIME AND STARTING CYCLES ARE MINIMAL. THE CYCLIC LIFE OF AN ENGINE OPERATING UNDER THESE CONDITIONS IS NOT SEVERE. GAS TURBINE ENGINES USED IN TRACTION DUTY EITHER IN COMMUTER-TYPE TRAIN SERVICE OR LONG-HAUL SERVICE HAVE A PARTICULARLY ARDUOUS LOAD CYCLING LIFE. IN BOTH OF THESE TYPES OF SERVICE THE TRAIN STARTING AND ACCELERATING CYCLE IS SIMILAR DUE TO THE USE OF THE DIRECT DRIVE TRANSMISSION. THE GENERAL ELECTRIC GT-E COMMUTER CAR INSTALLATION DOES NOT REQUIRE THE POWER TURBINE TO RUN IN THE STALLED CONDITION AND THIS, IN CONJUNCTION WITH THE INCREASED BASE LOAD, WILL ENSURE A

SLIGHTLY INCREASED MISSION LCF LIFE COMPARED TO THE DIRECT DRIVE SYSTEM USED IN THE TURBO TRAIN.

by CYRIL A. M. BLIZZARD
PRATT AND WHITNEY AIRCRAFT OF CANADA, LTD.,
INDUSTRIAL ENGINES, CANADA
Rept. No. SAE-770285; 1977; 11P
PRESENTED AT INTERNATIONAL AUTOMOTIVE
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DYNAMIC BEHAVIOR OF STRINGS OF AUTOMATED TRANSIT VEHICLES

THE EFFECTS OF SPACING POLICY AND CONTROL SYSTEM DESIGN ON THE DYNAMIC RESPONSE OF STRINGS OF AUTOMATED TRANSIT VEHICLES OPERATING UNDER VEHICLE-FOLLOWER CONTROL ARE EXAMINED. CONSTANT-SEPARATION, CONSTANT-TIME-HEADWAY, AND CONSTANT-SAFETY-FACTOR SPACING POLICIES ARE IMPLEMENTED AND THEIR OPERATIONAL IMPLICATIONS ARE DISCUSSED. THE DYNAMIC RESPONSE OF A STRING OF FIVE VEHICLES DURING SPEED CHANGING, MERGING, EMERGENCY STOPPING, AND FAILED-VEHICLE PUSHING IS EXAMINED. IT IS CONCLUDED THAT CONSTANT-SAFETY-FACTOR SPACING POLICY APPEARS TO BE SUPERIOR TO THE OTHER TWO POLICIES IN TERMS OF OVERALL SYSTEM OPERATIONS AND DYNAMIC BEHAVIOR OF VEHICLE STRINGS. MERGING OF VEHICLE STRINGS PLACES THE MOST SEVERE REQUIREMENTS ON CONTROL SYSTEM PERFORMANCE. COMPARED WITH CONSTANT-TIME-HEADWAY, CONSTANT-SAFETY-FACTOR SPACING POLICY RESULTS IN SIGNIFICANT IMPROVEMENTS IN DYNAMIC RESPONSE DURING MERGING OPERATIONS. CONSTANT-SEPARATION SPACING RESULTS IN VELOCITY WAVES WHICH ARE PROPAGATED UPSTREAM WITH INCREASING MAGNITUDE DURING SPEED TRANSITIONS. THIS UNDESIRABLE BEHAVIOR IS A KINEMATIC PHENOMENON WHICH CANNOT BE CORRECTED BY CONTROLLER DESIGN. IN ADDITION, A CONSTANT-SEPARATION POLICY HAS CONSIDERABLE OPERATIONAL DISADVANTAGES WHEN COMPARED WITH BOTH CONSTANT-SAFETY-FACTOR AND CONSTANT-TIME-HEADWAY OPERATIONS. THE CONSTANT-GAIN, LINEAR CONTROLLER DESIGNED FOR SPACING REGULATION PROVIDES SATISFACTORY DYNAMIC RESPONSE FOR SPEED CHANGING, EMERGENCY STOPPING, AND FAILED-VEHICLE PUSHING. DURING SEVERE MERGING MANEUVERS, HOWEVER, THE ADDITIONAL DAMPING PROVIDED BY THE VELOCITY-COMMAND CONTROLLER IS NEEDED TO SMOOTH THE VEHICLE RESPONSES FOR CONSTANT-SAFETY-FACTOR AND CONSTANT-TIME-HEADWAY OPERATION. NONLINEAR CONTROLLERS MAY IMPROVE DYNAMIC RESPONSE AND SHOULD BE IN-

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VESTIGATED FOR USE DURING OFF-NOMINAL OPERATIONS.

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MISSOURI, DEPT. OF CIVIL ENGINEERING
DOT-UMTA-MN-11-0002
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CORROSIVE ENVIRONMENT FACTORS ON AUTOMOBILE BODIES

THROUGH SURVEYS AND DATA INTERPRETATION, A COMPARISON OF ENVIRONMENTAL FACTORS WHICH ARE CORROSIVE TO AUTOMOBILE BODIES FOR THE VARIOUS AREAS OF THE U.S. IS PRESENTED. LOCATED IN THE EASTERN SECTION OF THE SO-CALLED "SNOW BELT," THE NORTHEAST WITH ITS SEVERE SNOWFALL NECESSITATING LARGE QUANTITIES OF DEICING ROAD SALT ALONG WITH SALT-LADEN SEA AIR POSES A SEVERE CORROSION ENVIRONMENT. IN THE HEART OF THE "SNOW BELT," THE EASTERN INDUSTRIAL AREA NOT ONLY CONTRIBUTES DEICING ROAD SALT TO PROMOTE AND ACCELERATE CORROSION OF AUTOMOBILE BODIES; BUT DUE TO THE HIGHLY URBAN ATMOSPHERE, HYGROSCOPIC CONTAMINANTS EMITTED DURING INDUSTRIAL PROCESSES AND GASEOUS CONTAMINANTS SUCH AS SULFUR DIOXIDE ALSO ADD TO THE DEGRADATION. THE MIDWEST AND EASTERN CANADA ARE TWO AREAS VERY SIMILAR WHEN COMPARING CORROSION RATES. WEATHER CONDITIONS ARE ALSO COMPARABLE, ALTHOUGH PARTS OF THE EASTERN CANADIAN REGION EXPERIENCE GENERALLY LOWER WINTER TEMPERATURES NECESSITATING THE USE OF CALCIUM CHLORIDE ON A LIMITED BASIS VS. SODIUM CHLORIDE. SUMMERTIME FINDS CALCIUM CHLORIDE USED ON SUB-URBAN AND RURAL DIRT ROADS AS A DUST CONTROL MEASURE DUE TO ITS HYGROSCOPIC NATURE; BECAUSE OF THIS, IT CAN ACCELERATE CORROSION ON AUTOMOBILE BODIES EVEN WHEN NO EXTERIOR MOISTURE SOURCE IS PRESENT. CORROSION IS A RELATIVELY MINOR PROBLEM IN THE PACIFIC NORTHWEST; THIS AREA IS ONE OF THE MILDEST IN THE COUNTRY IN THAT RESPECT. THE PRESENCE OF THE CHLORIDE ION, FROM SEA AIR, DOES HAVE AN ACCELERATING EFFECT ON BODY CORROSION AND HUMIDITY RESULTS IN "COSMETIC CORROSION" (RUST STREAKS), BUT THESE ARE NOT CONSIDERED MAJOR PROBLEMS. MARINE FOG AND SEA MIST THAT OCCUR ALONG THE WEST COAST ARE THE MAIN CONTRIBUTORS TO CORROSION IN THIS AREA, AND THE WARMER CLIMATE CAUSES A LARGER PERCENTAGE OF PERFORATED BODY PANELS THAN IS SEEN IN THE PACIFIC NORTHWEST. HOWEVER, THE CORROSION IN THIS AREA IS EXCESSIVELY MILD WHEN COMPARED TO THE REST OF THE COUNTRY. THE ARID SOUTHWEST SHOWS NO INCIDENCE OF PERFORATED BODY PANELS. HIGH HUMIDITY, DEW, FOG, AND SALT AIR ARE ALL FAC-

HSL 78-10

TORS WHICH AFFECT CORROSION OF CAR BODIES IN THE DEEP SOUTH AND GULF COAST. IN SUMMARY, CORROSION RATES IN EACH REGION, AS MEASURED BY PERFORATED BODY PANELS, ARE DEPENDENT UPON THE AMOUNT OF THE FOREIGN AGENTS PRESENT AND THE DEGREE AND DURATION OF MOISTURE. ALSO, CORROSION RATES UNDER DYNAMIC CONDITIONS MAY GREATLY DIFFER UNDER STATIC CONDITIONS IN THE SAME ENVIRONMENT OR ELECTROLYTE. PERCENT OF CARS WITH PERFORATED PANELS ARE CHARTED FOR THE MODEL YEARS 1970-1974.

by ANDREW M. KALSON, JR.
CHRYSLER CORP., METALLURGICAL ENGINEERING
DEPT.
Rept. No. SAE-770291; 1977; 6P 5REFS
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THE APPLICATION OF CORROSION PRINCIPLES TO ENGINEERING DESIGN

IN DISCUSSING THE APPLICATION OF CORROSION PRINCIPLES TO ENGINEERING DESIGN THE FOLLOWING AREAS ARE CONSIDERED: FACTORS AFFECTING CORROSION (METAL WORKING AND PROCESSING OPERATIONS, AND ENVIRONMENTAL CONDITIONS); TYPES OF CORROSION (PITTING CORROSION, CREVICE OR CONCENTRATION-CELL CORROSION, GALVANIC CORROSION, STRESS CORROSION, INTERGRANULAR CORROSION, EXFOLIATION CORROSION, DEALLOYING OR PARTING CORROSION, FRETTING CORROSION, AND CORROSION FATIGUE); VARIABILITY OF MATERIALS (ALUMINUM, COPPER, IRON AND STEEL, STAINLESS STEEL, MAGNESIUM, AND ZINC); METHODS OF CORROSION PREVENTION (ELECTROPLATED COATINGS, IMMERSION (CHEMICALLY-REDUCED) COATINGS, HOT-DIPPED COATING, CEMENTATION, CLAD COATINGS, SPRAYED-METAL COATINGS, VAPOR-DEPOSITED COATINGS, CONVERSION COATINGS (PHOSPHATE, CHROMATE, ANODIZED, OXIDE), ORGANIC COATINGS, AND PETROLEUM-BASE RUST PREVENTIVES); DESIGN CONFIGURATION (JOINTS AND FAYING SURFACES, CLOSED SECTIONS AND ENTRAPMENT AREAS, TRIM MOLDINGS AND DECORATIVE PARTS, PART CONFIGURATION, ELECTRICAL EQUIPMENT, AND LIQUID PASSAGES AND RESERVOIRS), AND FEASIBILITY OF RECOMMENDED ENGINEERING DESIGN (MATERIALS, OPERATIONAL PROCEDURES, PLANT FACILITIES, AND PEOPLE).

by LEONARD C. ROWE
GENERAL MOTORS CORP., RES. LABS., PHYSICAL
CHEMICAL DEPT.
Rept. No. SAE-770292; 1977; 17P 25REFS
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A PERSPECTIVE ON THE RETARDATION OF DEGRADATION IN POLYMERIC MATERIALS

STRUCTURE-PROPERTY RELATIONSHIPS (MOLECULAR WEIGHT, ELEMENTAL COMPOSITION, MOLECULAR WEIGHT DISTRIBUTION (MWD), ELEMENTAL ARRANGEMENT, AND MOLECULAR ARRANGEMENT) ARE USED TO DEFINE AND ILLUSTRATE THE DEVELOPMENT OF PROPERTIES. THE CHEMICAL CHANGES EFFECTING PROPERTY LOSS (LOSS OF MOLECULAR WEIGHT, CROSS LINKING, INCREASED MWD, AND CHANGE IN COMPOSITION) ARE SUMMARIZED. THE RETENTION OF PROPERTIES IS OUTLINED IN TERMS OF VARIOUS ADDITIVES (ANTIOXIDANTS, ANTIOZONANTS, AND LIGHT STABILIZERS).

by CHARLES C. DAVIS
GENERAL MOTORS INST.
Rept. No. SAE-770293; 1977; 15P 37REFS
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A TREATISE ON THE DEVELOPMENT OF A PROVING GROUND CORROSION TEST

THE CHRONOLOGICAL EVENTS AND ACTIONS WHICH HAVE RESULTED IN GENERAL MOTORS' ON-THE-ROAD ACCELERATED CORROSION TEST PROCEDURE AS IT EXISTS TODAY ARE DESCRIBED. THE TESTING IS TARGETED TOWARD THOSE CONDITIONS IN THE NORTHEASTERN U.S. SNOW BELT WHERE SUBSTANTIAL QUANTITIES OF DEICING SALTS ARE USED ON THE ROADS, AND THE COASTAL AREAS OF SOUTHERN FLORIDA AND TEXAS WHERE HIGH TEMPERATURES, HUMIDITIES, AND SALT AIR ARE PREVALENT. THE FOLLOWING PHYSICAL VARIABLES ARE CONTROLLED IN THE VEHICULAR CORROSION TESTING: SALT EXPOSURE, TEMPERATURE, HUMIDITY, MUD ACCUMULATION, GRAVEL EXPOSURE, AND THE DRIVING SCHEDULE. CORROSION IS ACCELERATED BY INCREASING THE PROPORTION OF TIME A VEHICLE IS EXPOSED TO A HIGH CORROSION ENVIRONMENT. THIS TEST AND ITS DERIVATIVES HAVE BEEN USED IN THE DEVELOPMENT OF GENERAL MOTORS' PRODUCTS FOR THE PAST SEVERAL YEARS.

by GLEN HOOK
GENERAL MOTORS CORP., DURABILITY TEST AND
DEVEL. DEPT.
Rept. No. SAE-770294; 1977; 10P 2REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE
ENGINEERING CONGRESS AND EXPOSITION,
DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-022 969

COMPARISON OF PRIMARY AND SECONDARY TASK MEASURES AS A FUNCTION OF SIMULATED VEHICLE DYNAMICS AND DRIVING CONDITIONS

EXPERIMENTAL STUDIES WERE CONDUCTED TO COMPARE PRIMARY AND SECONDARY MEASURES AS A FUNCTION OF SIMULATED VEHICLE DYNAMICS AND DRIVING CONDITIONS. IN A PREVIOUSLY REPORTED EXPERIMENT INVOLVING A MOVING BASE DRIVING SIMULATOR WITH COMPUTER-GENERATED DISPLAY, SECONDARY TASK MEASURES OF WORKLOAD SHOWED SIGNIFICANT INCREASES AS A FUNCTION OF LARGE CHANGES IN VEHICLE DYNAMICS AND DISTURBANCE LEVELS. BECAUSE THE SECONDARY TASK MEASURES APPEARED LESS SENSITIVE THAN DESIRED, DRIVING PERFORMANCE MEASURES RECORDED DURING THE SAME EXPERIMENT WERE LATER ANALYZED AND ARE REPORTED. PARTICULAR EMPHASIS IN EXAMINING THE DRIVING PERFORMANCE DATA WAS PLACED ON THE FOLLOWING TWO AREAS: DETERMINING THE DEGREE OF INTRUSION OF THE SECONDARY TASK ON THE DRIVING TASK AS A FUNCTION OF THE INDEPENDENT VARIABLES, AND COMPARING THE SENSITIVITY OF THE PRIMARY AND SECONDARY TASK MEASURES. THE RESULTS SHOWED THAT THE SECONDARY TASK DOES INTRUDE SIGNIFICANTLY UPON THE DRIVING TASK PERFORMANCE AT LOW WORKLOAD LEVELS, BUT THAT IT DOES NOT SIGNIFICANTLY INTRUDE AT HIGH WORKLOAD LEVELS. ALSO, WHEN THE FOUR PRIMARY TASK MEASURES (NUMBER OF STEERING REVERSALS, HIGH PASS STEERING (STANDARD) DEVIATION, YAW (STANDARD) DEVIATION, LATERAL (STANDARD) DEVIATION) WERE ANALYZED FOR SENSITIVITY TO THE INDEPENDENT VARIABLES, NEW INFORMATION WAS OBTAINED INDICATING GREATER SENSITIVITY THAN IS OBTAINED WITH THE SINGLE SECONDARY TASK MEASURE. STEERING RATIO, FOR EXAMPLE, IS FOUND TO AFFECT PERFORMANCE AT HIGH DISTURBANCE LEVELS, A RESULT NOT OBTAINED IN EXAMINING THE SECONDARY TASK BY ITSELF.

by WALTER W. WIERWILLE; JAMES C. GUTMANN
Publ: HUMAN FACTORS V20 N2 P233-44 (APR 1978)
1978; 15REFS
SPONSORED BY GENERAL MOTORS CORP., AND
VIRGINIA POLYTECHNIC INST. AND STATE UNIV.
Availability: SEE PUBLICATION

HS-022 970

TRANSPORT REQUIREMENTS FOR URBAN COMMUNITIES: PLANNING FOR PERSONAL TRAVEL

IN AN EFFORT TO PROVIDE A BACKGROUND DOCUMENT FOR TRANSPORTATION PLANNERS, SOME OF THE PROBLEMS INVOLVED IN THE METHODOLOGY OF URBAN TRANSPORTATION PLANNING AS APPLIED TO PERSONAL TRAVEL REQUIREMENTS ARE CONSIDERED. THE DISCUSSION IS CONCERNED CHIEFLY WITH THE FRAMEWORK IN WHICH RECENT PLANNING EXERCISES HAVE BEEN CARRIED OUT AND WAYS IN WHICH THESE CAN BE IMPROVED IN THE FUTURE. FIRST, ISSUES CURRENTLY FACING

WHAT CRITERIA SHOULD BE USED TO ASSESS THE QUALITY OF THE TRANSPORT FACILITIES AVAILABLE IN A PARTICULAR URBAN AREA, AND WHAT REALISTIC PERFORMANCE CRITERIA CAN BE USED TO EVALUATE THE IMPACTS OF TRANSPORT SYSTEMS ON USERS AND NONUSERS. NEXT, THE WAY IN WHICH THE TRANSPORTATION PLANNING PROCESS HAS EVOLVED TO DEAL WITH ISSUES IS ANALYZED. FINALLY, THREE AREAS IN WHICH PRESENT APPROACHES CAN BE IMPROVED ARE CONSIDERED. FIRST, THE OBJECTIVES OF TRANSPORT PLANNING REQUIRE CLEARER DEFINITION IN ORDER TO MAKE EXPLICIT THE RELATIONSHIP BETWEEN TECHNICAL DECISIONS AND POLICY ISSUES. SECOND, NEW METHODS SHOULD BE USED TO INCORPORATE THE STUDY OF NEEDS (AS EXPRESSED IN TERMS OF TRAVEL REQUIREMENTS) INTO A PLANNING PROCESS THAT CONCENTRATES ON DEMAND MODELING. AND, THIRD, EVALUATION METHODOLOGIES CAN BE IMPROVED BY RECOGNIZING THAT NO SINGLE CRITERION IS SUFFICIENT FOR MAKING A COMPREHENSIVE ASSESSMENT OF THE IMPACT OF PROPOSED MEASURES.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, RD. RES. GROUP, 2, RUE ANDRE-PASCAL, 75775 PARIS 16, FRANCE
Rept. No. OECD-40.141-1978; 1977; 93P 74REFS
Availability: OECD

HS-022 972

YOUR 1985 CAR WILL BE MADE PRIMARILY FROM (PICK ONE): ALUMINUM, STEEL, PLASTICS

APPLICATIONS OF ALUMINUM, STEEL, AND PLASTICS IN THE AUTOMOTIVE INDUSTRY BY 1985 ARE FORECAST. ACCORDING TO INDUSTRY PREDICTIONS, THE RATHER SLOW SHIFT TO ALUMINUM AS AN AUTOMOTIVE MATERIAL WILL ACCELERATE RAPIDLY BY 1980. THE AVERAGE 1980 MODEL WILL CONTAIN UP TO 200 POUNDS OF THE METAL, AND BY 1985 AS MUCH AS 400 POUNDS WILL BE USED IN THE AVERAGE CAR. AVERAGE VEHICLE WEIGHT IN 1985 WILL BE SOME 500 POUNDS LESS THAN IT IS TODAY. EXAMPLES OF THE NEW APPLICATIONS OF THE MATERIAL ARE STAMPED ALUMINUM WHEELS AND CHROME-PLATED ALUMINUM-SHEET BUMPERS WHICH WILL APPEAR ON SOME DOWN-SIZED CHRYSLER 1979 MODELS. INDUSTRY PREDICTION OF WIDESPREAD USE OF ALUMINUM HEADS (MANIFOLDS) IN 1980-1982, AND A PREDICTED WHOLE NEW GENERATION OF ALUMINUM-BLOCK ENGINES FOR THE 1982-1985 ERA. HIGH-STRENGTH STEELS (E.G. "DING-NO-MO," DUAL-PHASE, AND GM 980X) ARE BEING DEVELOPED BY THE AUTOMOTIVE INDUSTRY AND SOME ARE BEING USED TODAY (E.G. CHRYSLER'S 2137-LB OMNI/HORIZON WITH 8% OF ITS TOTAL WEIGHT CONSISTING OF HIGH-STRENGTH STEELS). PLASTICS PROBABLY OFFER MORE POTENTIAL AND CHALLENGE, TO THE AUTO INDUSTRY'S DESIGNERS AND MANUFACTURING EXPERTS THAN ANY OTHER MATERIAL. THE GREATEST CHALLENGE

COMPONENT WEIGHT AND ENERGY CONSUMPTION BETWEEN PLASTICS AND OTHER MATERIALS ARE RESULTING IN SIGNIFICANT CHANGES IN THE USE OF PLASTICS. ONE EXAMPLE IS THE PLASTIC FENDER LINER. THE AUTO INDUSTRY PREDICTS THAT THE CURRENT AVERAGE OF 400-500 POUNDS PER CAR WILL DECREASE TO 400-500 POUNDS BY 1985.

Publ: MACHINE DESIGN V50 N9 P16-8, 20-2
1978
Availability: SEE PUBLICATION

HS-022 972

CARTER'S AUTOMOTIVE OVERKILL [REVISITING STANDARDS]

THE REGULATORY CHALLENGES FACING THE AUTOMOTIVE INDUSTRY AS A RESULT OF DECISIONS MADE BY THE CARTER ADMINISTRATION ARE VIEWED FROM THE VIEWPOINTS OF SEVEN CLEVELAND LEVEL MANAGERS. IMPROVING FUEL ECONOMY FOR GM'S FIVE MILLION-PLUS CARS A YEAR IS ONE OF THE CORPORATION'S BIGGEST AND MOST COMPLEX REGULATORY CHALLENGES. WITH RESPECT TO EMISSIONS, THE FOLLOWING AREAS ARE OF CONCERN: TOUGHER AUTO STANDARDS FOR 1981, DELAYED STATUTORY EMISSION STANDARDS FOR 1981, TAMPER-RESISTANT CARBURETOR AND FUEL INJECTORS, NEXT FALL, IMPROVED EMISSION CONTROLS FOR HIGH-ALTITUDE CARS, DEVELOPING EMISSION SYSTEMS THAT CAN BE WARRANTED FOR 100,000 (22,680 KM), SELECTIVE ENFORCEMENT OF EMISSION SYSTEMS AT ASSEMBLY PLANTS, IMPLEMENTATION PLANS, END-OF-LINE TESTING FOR ALL VEHICLE EMISSION SYSTEMS, ESPECIALLY TOUGH CALIFORNIA STANDARDS, FLATABLE AIR BAGS, AUTOMATIC SEATBELTS, CONTROVERSIAL TRUCK AIR-BRAKE SYSTEMS, IMPROVED VEHICLE IDENTIFICATION (VIN'S) FOR GREATER THEFT PROTECTION, HEADLAMPS WITH DOUBLE THE CURRENT BRIGHTNESS, AND MORE ENERGY-ABSORBING BUMPER AREAS OF VEHICLE SAFETY THAT PRESENT CHALLENGES TO GM. WITH RESPECT TO VEHICLE NOISE, GM FEELS THAT THE GOVERNMENT'S NOISE PROGRAM, WHICH IS BEING IMPROVED BY THE OFFICE OF NOISE ABATEMENT AND CONTROL (ONAC), IS QUITE REASONABLE (IN 1981 THE NOISE TO 83 DBA FOR MEDIUM-DUTY TRUCKS AND IN 1982, 80 DBA). HOWEVER, GM IS AWAITING THE GOVERNMENT'S DECISION REGARDING NOISE REGULATION FOR HEAVY-DUTY TRUCKS. FOUR NEW FEDERAL STANDARDS FOR THE PLANT ENVIRONMENT (CLEAN AIR ACT, AMENDMENTS OF 1977, WATER QUALITY ACT, TOXIC SUBSTANCES CONTROL ACT, AND RESOURCE CONSERVATION AND RECOVERY ACT) ARE CREATING A CRITICAL SITUATION FOR THE AUTO INDUSTRY. GM ALSO CITES THE PROBLEMS RESULTING FROM HEALTH AND SAFETY

October 31, 1978

HS-022 975

DARDS ISSUED BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA); IT IS NOT THE INTENT OF THE OCCUPATIONAL SAFETY AND HEALTH ACT THAT GM IS AVERSE TO, RATHER ITS IMPLEMENTATION AND ENFORCEMENT.

by JOSEPH M. CALLAHAN

Publ: AUTOMOTIVE INDUSTRIES V158 N5 P30-7 (APR 1978)

1978

Availability: SEE PUBLICATION

HS-022 973

INFORMATION BULLETIN, AUGUST 1977 [MOTOR VEHICLE STATISTICS, SPAIN] (BOLETIN INFORMATIVO, AGOSTO 1977)

A CORRELATION ANALYSIS OF TRAFFIC ACCIDENTS IN SPAIN DURING THE PERIOD 1969-1974 IS PRESENTED WHICH SHOWS THE INTERDEPENDENCY BETWEEN TWO AND AMONG THREE AND FOUR VARIABLES. STATISTICAL TABLES ARE PROVIDED FOR THE SPANISH PROVINCES FOR THE MONTH OF AUG 1977 FOR THE FOLLOWING ITEMS: ACCIDENTS AND VICTIMS (FOR MAY ONLY); TOTAL VEHICLE REGISTRATIONS; TOTAL REGISTRATIONS OF TRUCKS, BUSES, PASSENGER CARS, MOTORCYCLES, AND INDUSTRIAL TRACTORS; TRUCK REGISTRATIONS ACCORDING TO MAKE, POWER, AND LOAD; BUS REGISTRATIONS ACCORDING TO MAKE, POWER, AND NUMBER OF SEATS; TOUR BUS REGISTRATIONS ACCORDING TO MAKE AND POWER; MOTORCYCLE REGISTRATIONS ACCORDING TO MAKE AND POWER; TRACTOR-TRAILER REGISTRATIONS ACCORDING TO MAKE AND POWER; AND TRAILER REGISTRATIONS ACCORDING TO MAKE AND LOAD. ALSO INCLUDED IN THE TABULATIONS ARE THE FOLLOWING: TRANSFERS OF VEHICLE OWNERSHIP ACCORDING TO TYPE OF VEHICLE; MODIFICATIONS OF VEHICLES; DRIVER'S LICENSES ISSUED ACCORDING TO CLASS; NEW DRIVER'S LICENSES ISSUED ACCORDING TO CLASS; DRIVER'S LICENSES ISSUED TO "FOREIGN NATIONALS" ACCORDING TO CLASS; DRIVER'S LICENSES CHECKED ACCORDING TO CLASS; SUSPENSIONS OF PERMITS AND DRIVER'S LICENSES ACCORDING TO CLASS, LENGTH OF SUSPENSION AND LENGTH OF TIME LICENSE HAD BEEN HELD; AND LAST REGISTRATION NUMBERS ISSUED ON 31 AUG 1977.

DIRECCION GENERAL DE TRAFICO, MADRID, SPAIN
1977; 175P

TEXT ALSO IN SPANISH.

Availability: REFERENCE COPY ONLY

HS-022 974

A STUDY OF THE EFFECT OF STRAIN RATE ON THE AUTOMOBILE CRASH DYNAMIC RESPONSE

FIXED BARRIER IMPACT ANALYSES USING THE LUMPED MASS METHOD HAVE BEEN PERFORMED ON A 1974 PINTO AUTOMOBILE FOR THE PURPOSE OF ASSESSING THE EFFECT OF THE RATE AT WHICH STRUCTURAL COMPONENTS DEFORM ON THE COMPARTMENT DYNAMIC CRASH RESPONSE. A VARIETY

OF RATE FUNCTIONS WAS USED AND THE RESULTS WERE COMPARED WITH CRASH TEST DATA AT 20, 30, 40, AND 50 MPH IMPACT VELOCITIES. THE RESULTS SHOW THAT THE RATE FUNCTION HAS A VERY SIGNIFICANT EFFECT ON THE VEHICLE DYNAMIC BEHAVIOR, AND THAT GREAT CARE MUST BE EXERCISED IN SELECTING THE APPROPRIATE RATE FUNCTION FOR SIMULATING THE AUTOMOBILE STRUCTURAL DYNAMIC RESPONSE IN CRASH CONDITIONS.

by J. E. TOMASSONI

NATIONAL HWY. TRAFFIC SAFETY
ADMINISTRATION, WASHINGTON, D.C. 20590

Publ: "AIAA/ASME 19TH STRUCTURES, STRUCTURAL DYNAMICS AND MATERIALS CONFERENCE. A COLLECTION OF TECHNICAL PAPERS," NEW YORK, 1978 P75-83

1978; 4REFS

PRESENTED AT THE CONFERENCE, BETHESDA, MD., 3-5 APR 1978.

Availability: AMERICAN INST. OF AERONAUTICS AND ASTRONAUTICS, 1290 AVE. OF THE AMERICAS, NEW YORK, N.Y. 10019

HS-022 975

CRITERIA FOR A SYSTEM OF VEHICLE IDENTIFICATION NUMBERS [AUSTRALIA]

EXISTING FORMATS AND APPLICATIONS OF VEHICLE IDENTIFICATION NUMBERS (VIN'S) IN THE U.S. AND AUSTRALIA ARE DISCUSSED, AND AN ALTERNATIVE, FEDERALLY ADMINISTERED SYSTEM OF IDENTIFICATION NUMBERS IS RECOMMENDED FOR PASSENGER CARS MANUFACTURED FOR SALE IN AUSTRALIA. ALTHOUGH THE AUSTRALIAN MOTOR VEHICLE SPECIFICATION BOARD REQUIRES THAT THE VIN BE LISTED ON THE COMPLIANCE PLATE, THERE IS NO ACCOMPANYING REGULATION OF THE CHARACTERISTICS OR LOCATION OF THIS NUMBER. IN THE U.S., FEDERAL MOTOR VEHICLE SAFETY STANDARD (FMVSS) 115, WHICH WAS INTRODUCED IN 1969, REQUIRES THAT EACH PASSENGER CAR HAVE A VIN. THE FORMAT OF THIS NUMBER IS NOT SPECIFIED NOR IS THE INFORMATION THAT SHOULD BE ENCODED, BUT THERE IS A REQUIREMENT THAT THE VIN'S OF TWO VEHICLES MANUFACTURED BY ONE COMPANY WITHIN A TEN-YEAR PERIOD SHALL NOT BE IDENTICAL. IT IS FURTHER REQUIRED BY THE U.S. STANDARD THAT THE VIN BE EMBOSSED OR ENGRAVED UPON A PART OF THE VEHICLE (OTHER THAN THE GLAZING) THAT IS NOT DESIGNED TO BE REMOVED EXCEPT FOR REPAIR OR ON A SEPARATE PLATE WHICH IS PERMANENTLY AFFIXED TO SUCH A PART. ALSO, THE STANDARD REQUIRES THAT THE VIN BE LOCATED INSIDE THE PASSENGER COMPARTMENT AND BE READABLE, WITHOUT MOVING ANY PART OF THE VEHICLE, THROUGH THE VEHICLE GLAZING UNDER DAYLIGHT LIGHTING CONDITIONS BY AN OBSERVER HAVING 20/20 VISION WHOSE EYE-POINT IS LOCATED OUTSIDE THE VEHICLE ADJACENT TO THE LEFT WINDSHIELD PILLAR. THE FOLLOWING ARE USES FOR THE VIN: RECALL OF DEFECTIVE VEHICLES, REGISTRATION AND INSURANCE PURPOSES, IDENTIFICATION OF A VEHICLE FOR COMPLIANCE WITH GOVERNMENT STANDARDS, IDENTIFICATION OF ABANDONED OR STOLEN VEHICLES, AND

RESEARCH PURPOSES. THERE IS AMPLE JUSTIFICATION FOR THE INTRODUCTION OF AN AUSTRALIAN DESIGN RULE (ADR) RELATING TO THE PROVISION AND LOCATION OF A VIN ON ALL PASSENGER CARS. THE FOLLOWING ITEMS OF INFORMATION ARE RECOMMENDED FOR INCLUSION IN AN AUSTRALIAN VIN SYSTEM: MAKE (TWO ALPHABETIC CHARACTERS), MODEL (ONE ALPHABETIC CHARACTER), BODY STYLE (ONE ALPHABETIC CHARACTER), ENGINE TYPE (ONE ALPHABETIC CHARACTER), MODEL YEAR (ONE ALPHABETIC CHARACTER), ASSEMBLY PLANT (ONE ALPHABETIC CHARACTER), AND SEQUENTIAL PRODUCTION NUMBER (SIX NUMERIC CHARACTERS). THIS SYSTEM SHOULD HAVE THE SAME FORMAT FOR ALL MAKES OF CAR, AND THE CODES FOR EACH ITEM OF INFORMATION, APART FROM THE SEQUENTIAL PRODUCTION NUMBER, SHOULD BE ASSIGNED BY A NATIONAL AUTHORITY. THE VIN SHOULD BE PERMANENTLY AFFIXED TO THE CAR IN SUCH A WAY THAT IT CAN BE READ BY AN OBSERVER STATIONED OUTSIDE THE CAR.

by A. J. MCLEAN
UNIVERSITY OF ADELAIDE, ROAD ACCIDENT RES.
UNIT, AUSTRALIA
ADOT-C9586
1975; 18P 14REFS
Availability: AUSTRALIAN DEPT. OF TRANSPORT,
ROAD SAFETY RES. SECTION

HS-022 976

DANGEROUS DECADE ON U.S. HIGHWAYS [ACCIDENT STATISTICS]

IF PRESENT TRENDS CONTINUE, IT IS SUGGESTED THAT THE U.S. WILL EXPERIENCE THOUSANDS OF ADDITIONAL DEATHS AND INJURIES ON THE HIGHWAYS IN THE COMING DECADE BECAUSE OF THE INCREASED USE OF SMALLER CARS. PARTICULARLY DANGEROUS IS THE COMBINATION OF SMALL CARS AND INEXPERIENCED YOUNG DRIVERS. BASED ON INJURIES REPORTED TO AUTO INSURANCE COMPANIES, STATISTICS SHOW THAT DRIVERS UNDER AGE 25 RUN AN 87% GREATER RISK OF BEING INJURED IN SUBCOMPACT-SIZED CARS THAN IN FULL-SIZED AUTOMOBILES. THE ADDED RISK IS ROUGHLY PROPORTIONAL TO THE DECREASING SIZE AND WEIGHT OF THE CAR. COMPACT CARS GENERATE 53% MORE INJURY CLAIMS AND THE INTERMEDIATES 31% MORE INJURY CLAIMS THAN FULL-SIZED CARS AMONG VEHICLES INVOLVING YOUTHFUL OPERATORS. DRIVERS OVER AGE 25 ALSO RUN SUBSTANTIALLY GREATER RISKS OF INJURY IN SMALL CARS. AMONG INSURED CARS CLASSIFIED AS HAVING NO YOUTHFUL OPERATORS, THE SUBCOMPACTS PRODUCED 52% MORE INJURY CLAIMS PER 1000 INSURED CAR-YEARS THAN FULL-SIZED CARS. COMPACTS POSE A 31% GREATER RISK, AND INTERMEDIATES AN 18% GREATER RISK. OVERALL, YOUNG DRIVERS HAVE TWICE AS MANY ACCIDENTS AS OLDER DRIVERS, AND NEARLY TWO-THIRDS OF MOTORISTS UNDER 25 NOW DRIVE COMPACT OR SUBCOMPACT CARS. AN ENCOURAGING NOTE IS THAT THE U.S. DRIVING POPULATION AS A WHOLE SHOULD BECOME SOMEWHAT LESS ACCIDENT-PRONE AS TODAY'S LARGE NUMBERS OF

TEENAGERS GAIN DRIVING EXPERIENCE, MATURE, AND MOVE OUT OF THE HIGH-HAZARD AGE GROUPS. THE NUMBER OF DRIVERS UNDER AGE 25 WILL PEAK ABOUT 1980 AND THEN DECLINE SIGNIFICANTLY BY 1990. THIS SHOULD BRING ABOUT A CORRESPONDING DROP IN YOUNG-DRIVER ACCIDENTS. THE FOLLOWING TIPS ON HOW TO MINIMIZE INJURY RISKS ARE PROVIDED: USE AVAILABLE LAP AND SHOULDER BELTS EVERY TIME YOU DRIVE; DRIVE AS LARGE A CAR AS YOU CAN AFFORD; BUY A CAR EQUIPPED WITH AIR BAGS AS SOON AS THEY BECOME AVAILABLE; TAKE PUBLIC TRANSPORTATION IF YOU HAVE THAT OPTION; BUY A FOUR-DOOR SEDAN RATHER THAN A TWO-DOOR SPORTS OR SPECIALTY MODEL; DO NOT BUY YOUR TEENAGER A SMALL CAR; DRIVE A MODERATELY-PRICED CAR MORE THAN TWO YEARS OLD IF YOU WANT TO HOLD DOWN AUTO INSURANCE COSTS; AND BEFORE YOU BUY A CAR, CHECK TO SEE HOW INSURANCE PREMIUMS VARY FOR DIFFERENT MODELS.

Publ: JOURNAL OF AMERICAN INSURANCE V53 N4
P21-5 (WINTER 1977-1978)
1978; 5REFS
Availability: SEE PUBLICATION

HS-022 977

AN ALL-SEASONS DRIVING GUIDE

AUTOMOBILE PREPARATION AND DRIVING TIPS, IN GENERAL, ARE OUTLINED. BEFORE EVER GETTING BEHIND THE WHEEL, ONE SHOULD BE SURE THAT THE AUTO IS READY FOR SEASONAL WEATHER CHANGES. CHECKING THE EXHAUST SYSTEM OF THE CAR IS A PRIMARY SAFETY MEASURE; IF THERE IS A FAULTY SYSTEM, CARBON MONOXIDE MAY WORK ITS WAY INTO THE PASSENGER COMPARTMENT. A WEAKENED OR FAULTY SUSPENSION SYSTEM CAN CAUSE DANGEROUS DRIVING CONDITIONS AND POSSIBLE LOSS OF STEERING CONTROL, PARTICULARLY UNDER WET OR ICY ROAD CONDITIONS. THE BATTERY SHOULD BE CHECKED FOR SERIOUS CORROSION, AS WELL AS TO SEE WHETHER IT NEEDS A CHARGE. STREAKY WINDSHIELD WIPERS CAN OBSCURE DRIVERS' VISION. BURNED-OUT HEADLIGHTS, FOG LIGHTS OR TAILLIGHTS CAN REDUCE THE VEHICLE'S VISIBILITY TO OTHER MOTORISTS. BRAKES SHOULD BE CHECKED BY A REPUTABLE MECHANIC. THE RADIATOR SHOULD BE INSPECTED; WHITE STREAKS OR CORROSION INDICATE EITHER RADIATOR OR HOSE LEAKS. IN ANY WEATHER, TIRES ARE ONE OF THE MOST IMPORTANT PARTS OF THE CAR. RADIAL TIRES ARE RECOMMENDED FOR THE MOTORIST WHO DOES A GREAT DEAL OF LONG-DISTANCE DRIVING. FOR SHORT-DISTANCE LOCAL DRIVING, UNBELTED BIAS-PLY TIRES ARE ACCEPTABLE. BIAS-BELTED TIRES ARE RECOMMENDED FOR MOTORISTS WHOSE DRIVING IS A MIXTURE OF LOCAL AND HIGHWAY TRAFFIC. FITTING THE TIRES TO A CAR PROPERLY AND PROPER INFLATION ARE TWO VERY IMPORTANT CONSIDERATIONS. SOME TIPS FOR DRIVING IN BAD WEATHER INCLUDE THE FOLLOWING: SLOW DOWN IF YOU SEE STANDING WATER ON THE ROAD AHEAD; IF THE CAR BEGINS TO HYDROPLANE,

TAKE YOUR FOOT OFF THE GAS SMOOTHLY AND GRADUALLY; IF THE CAR STARTS TO SKID, PUMP THE BRAKES RAPIDLY BUT LIGHTLY AND STEER IN THE DIRECTION THE REAR END OF THE CAR IS GOING; IF THE CAR STALLS IN A FLOODED ROAD, TRY TO COAST TO THE SIDE OF THE ROAD AND WAIT FOR THE ENGINE TO DRY OUT; APPLY BRAKES LIGHTLY WHILE DRIVING IF THEY GET WET IN ORDER TO DRY OUT THE LININGS AND OTHER COMPONENTS; AND KEEP BASIC EMERGENCY AND FIRST-AID EQUIPMENT IN YOUR CAR. SOME TIPS BY THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION FOR EMERGENCY SITUATIONS ON THE ROAD ARE ALSO INCLUDED (E.G. FLAT TIRES, FAILED WINDSHIELD WIPERS, FAILED BRAKES, STUCK ACCELERATOR PEDAL, DEAD BATTERY, OVERHEATED CAR, FIRES, AND LOSS OF STEERING CONTROL).

Publ: JOURNAL OF AMERICAN INSURANCE V53 N4 P8-11 (WINTER 1977-1978)

1978

Availability: SEE PUBLICATION

HS-022 978

FUEL CONSERVATION AND APPLIED RESEARCH

THE CRITICALLY IMPORTANT ROLE OF APPLIED RESEARCH IS IDENTIFIED IN A NUMBER OF SPECIFIC PAST (THE DEVELOPMENT AND IMPROVEMENT OF ELECTRICAL POWER GENERATION), PRESENT (CERAMIC GAS-TURBINE COMPONENTS, MAGNETOHYDRODYNAMIC ELECTRIC POWER GENERATION, AND THE SUPERCRITICAL AIRFOIL), AND FUTURE (VEHICLE AERODYNAMIC DRAG, AND TRIBOLOGY) ACTIVITIES RELATED TO FUEL CONSERVATION. THERE IS A PAUCITY OF FUNDING FOR APPLIED RESEARCH THAT CUTS ACROSS INDIVIDUAL GOVERNMENT-SPONSORED HARDWARE PROJECTS AND DIRECTLY BENEFITS TECHNOLOGY DEVELOPED OUTSIDE THE GOVERNMENT. THE IMPORTANCE OF APPLIED RESEARCH GENERALLY TENDS TO GO UNRECOGNIZED AS COMPARED WITH BASIC RESEARCH AND PRODUCT DEVELOPMENT PROCESSES, NOT ONLY IN FUEL CONSERVATION ACTIVITIES BUT IN VIRTUALLY EVERY AREA OF TECHNOLOGY IMPLEMENTATION. AN INSTITUTIONALIZATION OF THE MEANS BY WHICH APPLIED RESEARCH EFFORTS CAN BE ORGANIZED AND UTILIZED FOR AN EFFECTIVE LONG-TERM FUEL CONSERVATION PROGRAM IS SUGGESTED. THERE ARE WELL DEFINED ROLES FOR BOTH GOVERNMENT AND INDUSTRY IN THE EFFECTIVE UTILIZATION OF APPLIED RESEARCH, AND THE ENGINEERING SOCIETIES OFFER A POTENTIALLY EFFECTIVE EXISTING FRAMEWORK FOR GOVERNMENT AND INDUSTRY TO IMPLEMENT THESE ROLES.

by JERRY GREY; GEORGE W. SUTTON; MARTIN ZLOTNICK

Publ: SCIENCE V200 N4338 P135-42 (14 APR 1978)

1978; 21REFS

Availability: SEE PUBLICATION

HS-022 979

EMERGENCY BRAKE FUNCTION OF INERTIA BRAKES [SWEDEN; STANDARDS]

IN AN EFFORT TO DEVELOP PROVISIONAL SWEDISH STANDARDS FOR TRAILER EMERGENCY BRAKES; THE EMERGENCY BRAKE FUNCTION OF SEVEN DIFFERENT TRAILER INERTIAL BRAKE SYSTEMS HAS BEEN STUDIED. MEASUREMENTS OF RELEVANT PARAMETERS FOR THE EMERGENCY BRAKE FUNCTION WERE MADE AND TESTS OF BRAKE PERFORMANCE WHEN THE TRAILER WAS SEPARATED FROM A TOWING VEHICLE AT 50 KM/H WERE CONDUCTED. THE TESTS WERE CARRIED OUT WITH TRAILERS AND BRAKE SYSTEMS BOTH IN ORIGINAL CONDITION AND WITH SOME MODIFICATIONS. THE DESIGN OF EMERGENCY BRAKES PRESENTLY FOUND ON INERTIAL BRAKE SYSTEMS IS BASED ON A WIRE WHICH IS FASTENED TO THE TOWING VEHICLE AND WHICH ACTUATES THE PARKING BRAKE IF THE TRAILER SEPARATES FROM THE VEHICLE. THE RESULTS PROVIDE A BASIS FOR THE PROPOSAL OF A PROVISIONAL REQUIREMENT FOR EMERGENCY BRAKE OPERATION OF INERTIAL BRAKE SYSTEMS. AFTER THE ACTUATION MECHANISM IS MOMENTARILY EXPOSED TO A TENSILE FORCE OF 25% OF G, A CONSTANT BRAKING FORCE OF AT LEAST 35% OF G SHOULD BE OBTAINED. THE ACTUATION MECHANISM AND ITS FITTINGS SHOULD BE ABLE TO TOLERATE A TENSILE FORCE OF AT LEAST 35% OF G WITHOUT FAILURE. WHEN THE EMERGENCY BRAKE IS ACTIVATED, FORCES WHICH CAN AFFECT THE TRAILER'S DIRECTION OF MOTION SHOULD NOT BE TRANSMITTED. A LABORATORY METHOD IS PROPOSED FOR COMPLIANCE TESTING. THE TRAILER IS PLACED ON A ROLLING BRAKE TEST STAND WHICH IS LONGITUDINALLY IMMOBILIZED. AT A CONSTANT SPEED OF 50 KM/H, THE EMERGENCY WIRE OR CORRESPONDING ACTUATION MECHANISM IS EXPOSED TO A TENSILE FORCE OF 25% OF G FOR APPROXIMATELY ONE SECOND, AND THEN THE EXISTING BRAKE FORCE IS MEASURED. AT LEAST THREE SEPARATE EMERGENCY WIRES WITH CONNECTING PARTS ARE MEASURED WITH REGARD TO TENSILE STRENGTH WHILE BEING PULLED ON A SPECIAL TEST RIG.

by OLLE ODSELL

NATIONAL ROAD AND TRAFFIC RES. INST., FACK, S-58101 LINKÖPING, SWEDEN

Rept. No. VTI-143; 1977; 16P

Availability: TECHTRAN CORP., P.O. BOX 729, GLEN BURNIE, MD.

HS-022 980

THE PHYSICAL AND CHEMICAL CHARACTER OF DIESEL PARTICULATE EMISSIONS--MEASUREMENT TECHNIQUES AND FUNDAMENTAL CONSIDERATIONS

CONSIDERATION IS GIVEN TO THE SPECIAL NATURE OF PARTICULATES WHICH MAKE THEM SIGNIFICANT POLLUTANTS AND TO THE RELATIVE PLACE OF THE DIESEL ENGINE IN THE FORMATION OF MAN-MADE PARTICLES. THE UNDERLYING COMBUSTION PROCESSES LEADING TO CARBON-BASED

AND SULFUR-BASED PARTICULATES ARE REVIEWED. THE IMPORTANT VARIABLES IN STEPS OF THE COMBUSTION PROCESSES WHICH LEAD TO PARTICULATE FORMATION ARE CONSIDERED, AS WELL AS MAJOR FUEL AND ENGINE FACTORS. THE FOLLOWING PARTICULATE COLLECTION METHODS ARE DISCUSSED: DILUTION TUNNELS, FILTRATION, CENTRIFUGAL METHODS, THERMAL PRECIPITATION, ELECTROSTATIC PRECIPITATION, IN SOLUTION, SAMPLE PROBES AND LINES, ISOKINETIC SAMPLING, AND SAMPLING LINES. THE FOLLOWING ASPECTS/TECHNIQUES OF THE PHYSICAL CHARACTERIZATION OF PARTICULATE MATTER ARE CONSIDERED: SIMPLE MASS DETERMINATION, SIZE CLASSIFICATION, OPTICAL MICROSCOPY, TRANSMISSION ELECTRON MICROSCOPY, SCANNING ELECTRON MICROSCOPY, AND NONCOLLECTION TECHNIQUES. TECHNIQUES DISCUSSED WHICH ARE USED FOR THE CHEMICAL CHARACTERIZATION OF PARTICULATES INCLUDE THE FOLLOWING: SPECTRAL ANALYSIS (VISIBLE SPECTROPHOTOMETRY, INFRARED SPECTROPHOTOMETRY, ULTRAVIOLET SPECTROPHOTOMETRY, ATOMIC ABSORPTION, AND FLAME PHOTOMETRY), MASS SPECTROMETRY, CHROMATOGRAPHY (PAPER, THIN LAYER, COLUMN: GAS AND LIQUID), WET METHODS, AND ELECTROCHEMISTRY. EXAMPLES OF THE ANALYSIS OF DIESEL PARTICULATE EMISSIONS DURING PAST AND CURRENT RESEARCH AT THE MICHIGAN TECHNOLOGICAL UNIV. AND ELSEWHERE ARE PROVIDED.

by WILLIAM H. LIPKEA; JOHN H. JOHNSON; CARL T. VUK
MICHIGAN TECHNOLOGICAL UNIV.; JOHN DEERE
PRODUCT ENGINEERING CENTER
Rept. No. SAE-SP-430; SAE-780108; 1978; 61P 222REFS
PRESENTED AT CONGRESS AND EXPOSITION,
DETROIT, 27 FEB-3 MAR 1978. RESEARCH SPONSORED,
IN PART, BY ENVIRONMENTAL PROTECTION
AGENCY.
Availability: SAE

HS-022 981

AIR CONDITIONING AND HEATING SYSTEMS FOR TRUCKS

IN AN EFFORT TO ACQUAINT YOUNG ENGINEERS WITH THE PRINCIPLES OF COMFORT CONDITIONING FOR TRUCKS, THE ELEMENTS NECESSARY TO DESIGN AND DEVELOP INTEGRATED AIR CONDITIONING AND HEATING SYSTEMS FOR SUCH VEHICLES ARE REVIEWED. THE FOLLOWING PERTINENT SUBSYSTEMS ARE CONSIDERED: DASH-MOUNTED AIR HANDLING COMPONENTS, AIR DISTRIBUTION SYSTEM, OPERATOR CONTROLS, REFRIGERATION CIRCUIT, ELECTRICAL SYSTEM, AND VACUUM SYSTEM. THE PRINCIPLES AND THE CONFIGURATIONS THAT HAVE BEEN FOUND TO BE BEST FOR PAST APPLICATIONS ARE PRESENTED, AND THE ATTEMPT HAS BEEN TO TRY TO INDICATE SOME OF THE TRADE-OFFS INVOLVED IN DESIGNING AIR CONDITIONING AND HEATING SYSTEMS FOR TRUCKS. ALSO REVIEWED ARE THE PHYSIOLOGICAL

CONSIDERATIONS INVOLVED IN HEATING AND AIR CONDITIONING.

by KENNETH W. CUFFE
GENERAL MOTORS CORP., HARRISON RADIATOR DIV.
Rept. No. SAE-SP-425; SAE-780001; 1978; 49P 14REFS
THE 24TH L. RAY BUCKENDALE LECTURE,
SPONSORED BY EATON CORP.
Availability: SAE

HS-022 982

ESTIMATION OF VEHICLE AERODYNAMIC DRAG

A SIMPLE PROCEDURE WAS DEVELOPED FOR THE ESTIMATION OF ROAD VEHICLE AERODYNAMIC DRAG BASED ON EASILY QUANTIFIABLE VEHICLE SHAPE PARAMETERS. THE PROCEDURE IS APPLICABLE TO PASSENGER VEHICLES, STATION WAGONS, AND VANS AND IS BASED ON A "DRAG BUILT-UP" METHOD WHICH INCLUDES THE EFFECTS OF THE BASIC BODY SHAPE, UNDERPANNING, AND COOLING DRAG. NOT INCLUDED ARE THE EFFECTS OF LIFT, SIDEWIND, GROUND CLEARANCE, AND CERTAIN SHAPE DETAILS (E.G. FRONT END TREATMENT WHERE DEEP-SET HEADLIGHTS CAN PRODUCE TWO TO THREE TIMES THE DRAG OF FLUSH-MOUNTED LIGHTS, STRAKES OR SIDE FENCES WHICH FAIR THE LINE BETWEEN THE REAR WINDOW AND THE REAR HOOD ON NOTCHBACKS AND WHICH BY THEIR FENCING ACTION INCREASE THE BASE DRAG, AND CHIN SPOILERS AND REAR DECK DAMS OR UPTURNS WHICH, WHEN PROPERLY DESIGNED, HAVE BEEN SHOWN TO REDUCE VEHICLE DRAG). SEVERAL ASSUMPTIONS WERE INCORPORATED IN THE PRESENT FORMULATION OF A DRAG ESTIMATION PROCEDURE IN ORDER TO RETAIN THE PRIMARY OBJECTIVE OF SIMPLICITY OF APPLICATION. ALSO, THE LIMITED TEST DATA AVAILABLE AND THE LEVEL OF EFFORT ALLOTTED IMPOSED RESTRICTIONS ON THE SCOPE AND DEPTH OF THE ANALYSIS. FOR EXAMPLE, THE DRAG REDUCTION DUE TO ROUNDED EDGES IS OF CONCERN BECAUSE OF THE LARGE EFFECT DEMONSTRATED BY THE EXPERIMENTAL INFORMATION. THE ASSUMED VARIATION SHOULD BE REDEFINED IF NECESSARY. FURTHER EFFORT IS WARRANTED TO DETERMINE THE EFFECTIVE RADIUS FOR EDGES OF NONCIRCULAR SHAPE. OTHER SHAPED CORNERS (E.G. ELLIPTICAL) SHOULD BE COMPARED WITH THE CIRCULAR TO DETERMINE THE RELATIVE SIZES FOR SIMILAR OVERALL EFFECT ON THE LEADING EDGE SUCTION AND INFLUENCE ON FLOW AWAY FROM THE CORNERS. THE DRAG COEFFICIENT FOR A FLAT BASE HAS BEEN TAKEN AS CONSTANT IN THE PRESENT FORMULATION WITHOUT REGARD TO CHANGES TO THE CONFIGURATION. THE EXPERIMENTAL BASE PRESSURE COEFFICIENT MEASUREMENTS PRESENTED BY SALTZMAN DEMONSTRATE THAT VARIATIONS OCCUR DUE TO ROUNDING THE REAR EDGES. HOERNER PRESENTS A BASE DRAG COEFFICIENT VARIATION AS A FUNCTION OF FOREBODY DRAG, BUT IT IS APPLICABLE ONLY TO THE CONDITION OF WELL BEHAVED, NON-SEPARATED FLOW AHEAD OF THE BASE OF BODIES OF REVOLUTION. SINCE MOTOR VEHICLES OPERATE WITH A VARIATION OF FLOW CONDITIONS AROUND THE PERIPHERY OF THE BASE, A STUDY OF THE EFFECT ON THE AVERAGE BASE PRESSURE WOULD BE

October 31, 1978

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DESIRABLE. IN ADDITION TO PRESENTING THE AERODYNAMIC DRAG STUDY, THE RESULTS OF A PLANIMETER METHOD FOR DETERMINING VEHICLE FRONTAL AREA FROM PHOTOGRAPHIC ENLARGEMENTS ARE TABULATED AND DISCUSSED IN AN APPENDIX. ALSO APPENDED ARE BIBLIOGRAPHIES ON ROAD VEHICLE AERODYNAMIC DRAG AND PROCEDURES FOR ESTIMATION, AND WIND TUNNEL AND FULL-SCALE TESTING TECHNIQUES.

by BERNARD PERSHING; MAMORU MASAKI
AEROSPACE CORP., EL SEGUNDO, CALIF. 90245
EPA-68-01-0417
Rept. No. EPA-460/3-76-025; PB-275 948; 1976; 56P 125REFS
Availability: LIBRARY SERVICES OFFICE (MD-35),
RESEARCH TRIANGLE PARK, N.C. 27711; NTIS

HS-022 983

DRIVER RECORDS: AN AID IN FOLLOW-UP TRACKING AND VERIFICATION OF SELF- REPORTS OF ALCOHOLICS

A SURVEY WAS MADE OF THE FEASIBILITY OF OBTAINING DRIVER RECORDS FROM ALL 50 STATES AND THE DISTRICT OF COLUMBIA IN THE U.S., AND FROM THE 12 CANADIAN PROVINCES, FOR USE BY ALCOHOLISM TREATMENT PROGRAMS; AND A SECOND SURVEY WAS CONDUCTED TO DETERMINE THE PERCENTAGE OF ALCOHOLICS IN ACTIVE TREATMENT IN A CALIFORNIA ALCOHOLISM TREATMENT PROGRAM WHO HAD DRIVER RECORDS. ALL OF THE STATES AND ALL BUT ONE CANADIAN PROVINCE (PRINCE EDWARD ISLAND) WERE FOUND TO CONSIDER DRIVERS' RECORDS AS PUBLIC RECORDS AND WILL PROVIDE COPIES TO REQUESTING PARTIES AT LITTLE OR NO COST. SPECIFIC INFORMATION REQUIRED BY EACH STATE OR PROVINCE FOR REQUESTING DRIVER RECORDS AND THE CHANGE, IF ANY, FOR REQUESTING A SINGLE RECORD ARE TABULATED. CURRENT DRIVER RECORDS WERE OBTAINED FOR 452 (90.4%) OF 500 CONSECUTIVE ADMISSIONS TO A SOUTHERN CALIFORNIA PUBLIC ALCOHOLISM TREATMENT PROGRAM, INDICATING THE UTILITY OF OBTAINING SUCH RECORDS EVEN FOR PERSONS WHO HAVE LOST THEIR DRIVING PRIVILEGES. DRIVER RECORDS ARE USEFUL FOR LOCATING SUBJECTS IN FOLLOW-UP STUDIES, PROVIDE OBJECTIVE INFORMATION REGARDING TREATMENT OUTCOME, AND CAN BE USED TO DETERMINE THE VERACITY OF SUBJECTS' SELF-REPORTS OF DRIVING INFRACTIONS.

by LINDA C. SOBELL; MARK B. SOBELL
NIAA-1-R18-AA00486; NIAA-5-T01-AA00100-02
Publ: INTERNATIONAL JOURNAL OF THE
ADDICTIONS V12 N4 P429-38 (1977)
1977; 19REFS
Availability: SEE PUBLICATION

HS-022 984

INDUCING THE DEVELOPMENT AND ADOPTION OF SOCIALLY EFFICIENT AUTOMOTIVE TECHNOLOGY. FINAL REPORT

IN CONJUNCTION WITH THE AUTO TECHNOLOGY PROG., FEDERAL POLICIES FOR INDUCING THE DEVELOPMENT AND ADOPTION OF INNOVATIVE AUTOMOBILE TECHNOLOGY ARE EXAMINED USING A WELFARE ECONOMICS FRAMEWORK. "SOCIALLY EFFICIENT" TECHNOLOGY IS DEFINED, BASED ON THE PREMISE THAT PEOPLE ACT IN THEIR OWN SELF-INTEREST AND REVEAL THAT SELF-INTEREST IN THEIR MARKETPLACE DECISIONS. CRITERIA FOR EVALUATING THE EXTENT TO WHICH PUBLIC POLICIES MAY CONTRIBUTE TO SOCIALLY MORE EFFICIENT AUTOMOTIVE TECHNOLOGY ARE DEFINED AND INCLUDE THE FOLLOWING: FEASIBILITY AND EFFICACY, MECHANISM FOR TRADE-OFFS, INFORMATION REQUIREMENTS, INCENTIVES FOR INFORMATION GENERATION, INCENTIVES FOR OPTIMIZING TECHNOLOGY, AND EFFECTS ON UNCERTAINTY. THE PROSPECT OF PROFIT IS IDENTIFIED AS THE MAJOR FORCE WHICH DRIVES INNOVATIVE EFFORT. POSSIBLE IMPEDIMENTS TO INNOVATION OF SOCIALLY MORE EFFICIENT TECHNOLOGY ARE DISCUSSED AND INCLUDE THE FOLLOWING: PRESENCE OF EXTERNALITIES (E.G. A NEW ENGINE WHICH HAS LOWER EMISSIONS, THE BENEFITS OF WHICH DO NOT ACCRUE TO THE CAR'S PURCHASER); INFORMATION DIFFICULTIES THAT INHIBIT THE PURCHASER'S CHOICE OF A CAR WHICH IS MOST SUITABLE, THUS INHIBITING INNOVATIONS WHICH ARE DIFFICULT FOR THE PURCHASER TO EVALUATE; AND UNCERTAINTY (WHICH CAN BE INCREASED BY MANDATORY STANDARDS). MARKET POWER AND ALLEGED SOCIAL IRRESPONSIBILITY OF MANUFACTURERS ARE FOUND NOT TO BE IMPEDIMENTS. SOME EMPIRICAL EVIDENCE ON EXTERNAL DISECONOMIES OF AUTOMOTIVE DESIGN ARE SUMMARIZED. CLEAR EXTERNALITIES EXIST FOR EMISSIONS AND NOISE. SAFETY EXTERNALITIES EXIST, BUT MIGHT BE SUBSTANTIALLY REDUCED BY INSURANCE RATE REFORM. EXTERNAL DISECONOMIES ARE FOUND NOT TO EXIST IN AREAS NOW REGULATED BY DAMAGEABILITY AND FUEL ECONOMY STANDARDS, ASSUMING THAT THE PRICE OF FUEL REFLECTS ITS SOCIAL COST. A CONCEPTUAL FRAMEWORK IS PRESENTED WHICH ARRAYS REGULATORY POLICIES IN A SPECTRUM RANGING FROM MORE TO LESS GOVERNMENT INTERVENTION, AS FOLLOWS: SPECIFICATION OF PRODUCT CHARACTERISTICS OR TECHNOLOGY, MANDATORY PERFORMANCE STANDARDS, FISCAL INCENTIVES, MANDATORY PRODUCT INFORMATION, AND MARKET FORCES. MAJOR REGULATORY LAWS ARE SUMMARIZED, AND PRESENT REGULATIONS ARE LISTED. MOST REGULATION CONSISTS OF MANDATORY PERFORMANCE STANDARDS OR PRODUCT CHARACTERISTICS SPECIFICATION. NO SUPPORT WAS FOUND FOR THE HYPOTHESIS THAT CONGRESS, IN ESTABLISHING A FRAMEWORK FOR AUTOMOTIVE REGULATION, WAS SEEKING TO INTERNALIZE EXTERNAL DISECONOMIES, OR TO ACHIEVE GREATER SOCIAL EFFICIENCY. FINALLY, ALTERNATIVE POLICIES ARE PRESENTED AND EVALUATED ACCORDING TO THE WELFARE ECONOMICS CRITERIA. THE AL-

TERNATIVE POLICIES ARE A NEW CAR EMISSIONS TAX AND SAFETY INFORMATION WITH INSURANCE RATE REFORM. IT IS BELIEVED THAT FEASIBLE ALTERNATIVES TO MANDATORY STANDARDS EXIST WHICH RELY MORE ON MARKET FORCES AND INDIVIDUAL CHOICE AND HAVE THE POTENTIAL FOR BETTER INDUCING THE DEVELOPMENT AND INTRODUCTION OF SOCIALLY MORE EFFICIENT AUTOMOTIVE TECHNOLOGY.

by HAYDEN BOYD
CHARLES RIVER ASSOCIATES INC., 1050
MASSACHUSETTS AVE., CAMBRIDGE, MASS. 02138
Rept. No. DOT-TSC-RSPD-78-4; 1978; 64P 46REFS
REPT. FOR JAN-JUN 1977.
Availability: NTIS

HS-022 985

POLICY AND OPERATING TECHNIQUES IN PERSONAL AUTOMOBILE INSURANCE

IN THE SECOND OF TWO ARTICLES PRESENTING THE RESULTS OF A STUDY OF PERSONAL AUTOMOBILE INSURANCE UNDERWRITING, THE RESULTS OF A MAIL SURVEY DEALING WITH THE IMPORTANCE AND USAGE OF UNDERWRITING INFORMATION FACTORS, AND THE ROLE OF THE INVESTIGATIVE REPORT ARE PRESENTED. A QUESTIONNAIRE WAS SENT TO 206 INSURANCE COMPANIES WRITING PRIVATE PASSENGER AUTO INSURANCE IN THE U.S., REQUESTING AN EVALUATION OF 72 FACTORS CONSIDERED BY UNDERWRITERS IN EVALUATING THE ACCEPTABILITY OF APPLICANTS FOR INSURANCE. LAW VIOLATION INFORMATION WAS CONSIDERED THE MOST IMPORTANT OF EIGHT GROUPS INTO WHICH THE FACTORS WERE CLASSIFIED, FOLLOWED IN ORDER OF IMPORTANCE BY ACCIDENTS AND LOSSES, AUTO INFORMATION, PERSONAL INFORMATION, YOUTHFUL OPERATOR INFORMATION, PREVIOUS INSURANCE, NAME (RESIDENCE AND NEIGHBORHOOD ALSO), AND EMPLOYMENT. OVERALL, THOSE FACTORS WHICH ARE CONSIDERED IN THE MANUAL RATE CLASSIFICATIONS WERE JUDGED MORE IMPORTANT THAN NONRATING FACTORS. RANKINGS FOR THE INDIVIDUAL FACTORS ARE TABULATED AND DISCUSSED. INFORMATION WAS FOUND TO BE OBTAINED VERY CONSISTENTLY ON ACCIDENTS AND LOSSES, AND LAW VIOLATIONS. AND AS A GROUP, INFORMATION IS OBTAINED ON A LARGER PERCENTAGE OF THE FACTORS IN THESE TWO GROUPS THAN IN ANY OF THE OTHER INFORMATION GROUPS. OVERALL, UNDERWRITERS JUDGED INVESTIGATIVE REPORTS MOST USEFUL IN OBTAINING INFORMATION ON LAW VIOLATIONS, ACCIDENTS AND LOSSES, AND PERSONAL INFORMATION. IN THE AUTOMOBILE INFORMATION AND YOUTHFUL OPERATOR GROUPS THERE WAS NOT THE SAME LEVEL OF AGREEMENT ON THE USEFULNESS OF THE REPORT. THE USEFULNESS OF THE INVESTIGATIVE REPORT IN OBTAINING OR VERIFYING EACH OF THE 72 TYPES OF INFORMATION IS DESIGNATED FOR EACH FACTOR IN TABULAR FORM AND IS DISCUSSED. THERE IS A NEED TO RESTRUCTURE THE CONTENT OF THE INVESTIGATIVE REPORT IN ORDER TO ADD INFORMATION

CONSIDERED IMPORTANT AND DELETE INFORMATION THAT IS NOT.

by LARRY D. GAUNT
Publ: BEST'S REVIEW; PROPERTY/CASUALTY
INSURANCE EDITION V78 N12 P16, 98-106 (APR 1978)
1978
SPONSORED BY EQUIFAX SERVICES INC.,
PROPERTY/CASUALTY DIV., ATLANTA, GA. 30302.
Availability: SEE PUBLICATION

HS-022 987

EVALUATION OF LABORATORY METHODS FOR THE STUDY OF DRIVER BEHAVIOR: RELATIONS BETWEEN SIMULATOR AND STREET PERFORMANCE

A STUDY WAS UNDERTAKEN TO EVALUATE LABORATORY METHODS USED TO EXAMINE DRIVER BEHAVIOR, SPECIFICALLY TO COMPARE THE PERFORMANCE OF DRIVERS ON THE ROAD WITH THEIR PERFORMANCE IN THE LABORATORY ON TWO WIDELY USED SIMULATORS. OBSERVATIONS WERE MADE ON 304 TAXI DRIVERS, UNBEKNOWN TO THEM, DURING A RIDE THROUGH TRAFFIC; AND THEIR PERFORMANCE ON SPECIFIC DRIVING BEHAVIORS WAS RECORDED. TWO-THIRDS OF THE DRIVERS WERE THEN ASKED TO PARTICIPATE IN THE LABORATORY STUDY IN WHICH THEY PERFORMED ON TWO DIFFERENT DRIVING SIMULATORS AND ALSO TOOK PART IN FOUR PERCEPTUAL-MOTOR TESTS. OFFICIALLY RECORDED ACCIDENTS AND VIOLATIONS OVER A FIVE-YEAR PERIOD WERE OBTAINED FOR EACH DRIVER FOR COMPARISON WITH PERFORMANCE DATA. NONE OF THE COMPONENT OR TOTAL SCORES FROM EITHER OF THE TWO SIMULATORS CORRELATED WITH ANY OF THE ON-THE-STREET DRIVING BEHAVIOR BEST REPRESENTED IN THE SIMULATORS. ALTHOUGH THIS LACK OF SIGNIFICANT CORRELATIONS COULD REFLECT INADEQUACIES IN THE ON-THE-STREET MEASURES, OTHER EVIDENCE CALLED INTO QUESTION THE GENERALITY OF THE SIMULATOR MEASURES. IT WAS HOPED THAT THE INCLUSION OF BASIC PERCEPTUAL-MOTOR ABILITY TESTS WOULD THROW FURTHER LIGHT ON THE MEASUREMENTS MADE USING THE SIMULATORS. ALTHOUGH RELATIONSHIPS BETWEEN ABILITY TEST SCORES AND SIMULATOR SCORES PROVED LOW, THEY WERE HIGHER THAN THOSE BETWEEN SCORES OBTAINED ON THE TWO SIMULATORS THEMSELVES. HOWEVER, AS WITH THE SIMULATORS, THE PERCEPTUAL-MOTOR TESTS WERE NOT SUCCESSFUL IN PREDICTING ON-THE-ROAD PERFORMANCE. FROM THE INTERNAL RELATIONS OBTAINED ON EACH SIMULATOR, IT WAS POSSIBLE TO SHOW WHAT COMPONENT SCORES CONTRIBUTE TO TOTAL SCORES ON THE SIMULATOR. ON BOTH SIMULATORS, "BRAKE" AND "SPEED" WERE MORE IMPORTANT IN DETERMINING INDIVIDUAL DIFFERENCES IN OVERALL PERFORMANCE THAN WERE OTHER COMPONENT SCORES. OVERALL PERFORMANCE "ON-THE-STREET" WAS BEST PREDICTED BY THE SPECIFIC DRIVING ERRORS OF "CHANGING LANES WITHOUT A SIGNAL" AND "EXCESSIVE SPEED." AGE WAS THE MOST CONSISTENT PREDICTOR OF PERFORMANCE ON BOTH

October 31, 1978

HS-022 991

SIMULATORS; THE GREATER THE AGE, THE POORER THE PERFORMANCE ON A NUMBER OF SIMULATOR MEASURES. LOW CORRELATIONS WERE FOUND BETWEEN ALL PERFORMANCE MEASURES AND THE RECORDED ACCIDENT/VIOLATION DATA. A FEW SIGNIFICANT PREDICTIONS OF CERTAIN CLASSES OF PRIOR TRAFFIC VIOLATIONS WERE ACHIEVED BY THE ON-THE-STREET OBSERVATIONS; THE MOST CONSISTENT PREDICTOR WAS THE "EXCESSIVE SPEED" BEHAVIOR. FINALLY, SIGNIFICANT BUT LOW CORRELATIONS WERE FOUND BETWEEN THE DRIVERS' REACTION TIME TEST SCORES AND THEIR HISTORY OF "COLLISION" VIOLATIONS.

by DOROTHY S. EDWARDS; CLIFFORD P. HAHN;
EDWIN A. FLEISHMAN
PHS-ECA-8R01-UI-00695
Publ: JOURNAL OF APPLIED PSYCHOLOGY V62 N5
P559-66 (1977)
1977; 10REFS
Availability: SEE PUBLICATION

HS-022 989

TRANSPORTATION SAFETY INFORMATION REPORT. OCTOBER, NOVEMBER, AND DECEMBER 1977 AND ANNUAL SUMMARY. FINAL REPORT

A COMPENDIUM OF SELECTED U.S. TRANSPORTATION SAFETY STATISTICS FOR ALL MODES OF TRANSPORTATION FOR THE FOURTH QUARTER OF 1977, AS WELL AS FOR THE ENTIRE YEAR, IS PRESENTED. TRANSPORTATION FACILITIES, ACCIDENTS, AND INJURIES ARE PRESENTED AND COMPARED ON A MONTHLY AND QUARTERLY BASIS FOR 1977 AND 1976. AN OVERVIEW OF SAFETY PERFORMANCE, MODAL SAFETY HAZARDS, AND SAFETY PROGRAMS IS PROVIDED FOR EACH TRANSPORTATION MODE (HIGHWAY, RAIL, RAIL RAPID TRANSIT, AVIATION, MARINE (WATERBORNE TRANSPORTATION, RECREATIONAL BOATING), MATERIALS TRANSPORTATION (PIPELINES, HAZARDOUS MATERIALS)). FEATURED IN THIS QUARTERLY REPORT ARE DISCUSSIONS ON RAILROAD TANK CAR SAFETY AND ROADSIDE TRUCK INSPECTIONS. IN SUMMARY, THE TRANSPORTATION PICTURE FOR 1977 WAS CHARACTERIZED BY THE FOLLOWING: A SLIGHT RISE IN TOTAL TRANSPORTATION FATALITIES, PRIMARILY A RESULT OF INCREASES IN HIGHWAY, AVIATION AND RAILROAD FATALITIES; A TOTAL OF 46,880 MOTOR VEHICLE TRAFFIC FATALITIES, UP 3% FROM 1976; AN INCREASE IN AVIATION FATALITIES, AIR CARRIER FATALITIES REACHING A RECORD 654 (573 IN TENERIFE, CANARY ISLANDS CRASH); LOWEST NUMBER OF TOTAL AIR CARRIER ACCIDENTS AND LOWEST ACCIDENT RATE IN HISTORY EVEN THOUGH AIRCRAFT MILES AND HOURS FLOWN WERE THE HIGHEST SINCE 1970; A RECORD LOW FOR GENERAL AVIATION FATALITY RATE WHILE NUMBER OF ACCIDENTS AND FATALITIES WERE UP; A CONTINUED PROBLEM WITH THE DERAILMENT OF TANK CARS CARRYING HAZARDOUS MATERIALS; ISSUANCE OF FINAL RULE BY THE MATERIALS TRANSPORTATION BUREAU (MTB) FOR IMPROVING DESIGN AND CONSTRUCTION OF 112/114 TANK CARS; AN INCREASE IN PIPELINE INJURIES AND ACCIDENTS; AND A RECORD LOW OF 9.4 RECREA-

TIONAL BOATING FATALITIES PER 100,000 REGISTERED BOATS.

TRANSPORTATION SYSTEMS CENTER,
TRANSPORTATION INFORMATION DIV., KENDALL
SQUARE, CAMBRIDGE, MASS. 02142
Rept. No. DOT-TSC-P24-77-4; NTISUB/C/224-004; 1978; 120P
REFS
Availability: NTIS \$9.00

HS-022 990

PRELIMINARY POWER TRAIN DESIGN FOR A STATE-OF-THE-ART ELECTRIC VEHICLE

A REVIEW OF THE STATE OF THE ART OF ELECTRIC VEHICLES BUILT SINCE 1965 WAS CONDUCTED TO ESTABLISH A BASE FOR THE PRELIMINARY DESIGN OF A POWER TRAIN FOR A STATE-OF-THE-ART ELECTRIC VEHICLE. STUDIES WERE MADE TO EVALUATE THE PERFORMANCE OF EXISTING ELECTRIC VEHICLES AND TO ESTABLISH PRELIMINARY SPECIFICATIONS FOR A POWER TRAIN DESIGN USING STATE-OF-THE-ART TECHNOLOGY AND COMMERCIALLY AVAILABLE COMPONENTS. POWER TRAIN COMPONENTS WERE EVALUATED AND SELECTED USING A COMPUTER SIMULATION OF THE SAE J227A SCHEDULE D DRIVING CYCLE. PREDICTED RANGE WAS DETERMINED FOR A NUMBER OF MOTOR AND CONTROLLER COMBINATIONS IN CONJUNCTION WITH THE MECHANICAL ELEMENTS OF POWER TRAINS AND A BATTERY PACK OF 16 LEAD-ACID BATTERIES, 471.7 KG AT 0.093 MJ/KG (1040 LBS AT 11.7 WHR/LB). ON THE BASIS OF MAXIMUM RANGE AND OVERALL SYSTEM EFFICIENCY USING THE SCHEDULE D CYCLE, AN INDUCTION MOTOR AND THREE-PHASE INVERTER/CONTROLLER WAS SELECTED AS THE OPTIMUM COMBINATION WHEN USED WITH A TWO-SPEED TRANSAXLE AND STEEL-BELTED RADIAL TIRES. THE PREDICTED SCHEDULE D RANGE IS 90.4 KM (56.2 MD). FOUR NEAR-TERM IMPROVEMENTS TO THE ELECTRIC VEHICLE WERE IDENTIFIED, EVALUATED, AND PREDICTED TO INCREASE RANGE APPROXIMATELY 7%: INCREASED BATTERY VOLTAGE, OVERDRIVE CRUISE GEARING, PERMANENT MAGNET AC MOTOR, AND AUTOMATIC GEAR SHIFTING.

by JAMES A. ROSS; GERALD A. WOOLDRIDGE
NATIONAL AERONAUTICS AND SPACE
ADMINISTRATION, LEWIS RES. CENTER,
CLEVELAND, OHIO 44135; ROHR INDUSTRIES, INC.,
ADVANCED TRANSPORTATION SYSTEMS, CHULA
VISTA, CALIF. 92010
EC-77-A-31-1044
Rept. No. DOE/NASA/0592-78/1; NASA-CR-135340; RHR-78-035; 1978; 213P 118REFS
SUBCONTRACTED TO ROHR INDUSTRIES, INC., NAS-3-20592.
Availability: NTIS

HS-022 991

MICROPROCESSOR CONTROLLER DEVELOPMENTS

A COMPILATION OF PAPERS DISCUSSING
MICROPROCESSOR CONTROLLER DEVELOPMENTS IN

AUTOMOTIVE SYSTEMS IS PRESENTED. THE FOLLOWING TOPICS ARE INCLUDED: A MICROPROCESSOR-CONTROLLED AUTOMOTIVE AM/FM RADIO, CHRYSLER MICROPROCESSOR SPARK ADVANCE CONTROL, A PRACTICAL APPLICATION OF MICROPROCESSORS IN THE AUTOMOTIVE ENVIRONMENT, SINGLE CHIP MICROCOMPUTERS IN AUTOMOTIVE SYSTEMS, MANAGING AUTOMOTIVE MICROPROCESSOR INTERFACES, SIMPLIFICATION OF SYSTEM INPUTS AND OUTPUTS FOR MPU CONTROL UNITS, AN AUTOMOTIVE CONTROL DEVELOPMENT SYSTEM, AND A PULSE MODULATION A/D CONVERTER.

SOCIETY OF AUTOMOTIVE ENGINEERS, INC., 400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096
Rept. No. SAE-SP-426; 1978; 64P REFS
INCLUDES HS-022 992-HS-022 999. PRESENTED AT CONGRESS AND EXPOSITION, DETROIT, 27 FEB-3 MAR 1978.

Availability: SAE

HS-022 992

A MICROPROCESSOR-CONTROLLED AUTOMOTIVE AM/FM RADIO

THE SYSTEM FEATURES, AND GIVES PRIORITY TO, A CLOCK DISPLAY; HOWEVER THE 3.5-DIGIT LED (LIGHT EMITTING DIODE) DISPLAY CAN ALSO SERVE AS A FOUR YEAR CALENDAR, A 12-HOUR ELAPSED-TIME COUNTER, OR A CHANNEL-FREQUENCY DISPLAY, ON REQUEST. THE TUNING PROCESS AUTOMATICALLY ACTIVATES THE FREQUENCY DISPLAY. THERE IS FREQUENT NEED FOR A TIMER OR REAL-TIME CLOCK IN MICROCOMPUTER SYSTEMS: UNLESS A TIMER IS PROVIDED ON THE CHIP OR ADDED EXTERNALLY, THE TIMING MUST BE IMPLEMENTED ENTIRELY IN SOFTWARE, A TASK THAT OFTEN REQUIRES CAREFULLY STRUCTURED PROGRAMS. THE DESIGN DESCRIBED OVERCOMES THESE DIFFICULTIES BY TAKING ADVANTAGE OF INHERENT ARCHITECTURAL FEATURES IN THE COSMAC PROCESSOR. IT IS SHOWN THAT THE RUNNING OF ANY RANDOM PROGRAM SEQUENCE CAN AUTOMATICALLY PROVIDE A KNOWN AND ACCURATE TIME INTERVAL. THE DETERMINATION AND DISPLAY OF FREQUENCY CHANNELS BY THE GENERATION OF HIGHLY ACCURATE SOFTWARE TIMING GATES AND THE AUTOMATIC AND MANUAL CONTROL OF DISPLAY MODES ARE DISCUSSED. WHILE THE IGNITION SWITCH TURNS THE DISPLAY ON OR OFF, THE CPU AND CLOCK RUN CONTINUOUSLY. THE USE OF CMOS CIRCUITRY IN THE SYSTEM KEEPS THE POWER DRAIN BELOW 5 MILLIAMPERES AND ASSURES MONTHS OF SYSTEM OPERATION, EVEN WHEN THE VEHICLE (BATTERY) IS NOT USED.

by KAARE KARSTAD
RCA SOLID STATE DIV., SOMERVILLE, N.J.
Publ: HS-022 991 (SAE-SP-426), "MICROPROCESSOR CONTROLLER DEVELOPMENTS," WARRENDALE, PA., 1978 P1-9
Rept. No. SAE-780116; 1978; 3REFS
Availability: IN HS-022 991

HS-022 993

CHRYSLER MICROPROCESSOR SPARK ADVANCE CONTROL

A MICROPROCESSOR-BASED SPARK CONTROL COMPUTER WAS DEVELOPED TO MEET FUTURE ENGINE CONTROL APPLICATIONS WHICH MAY REQUIRE MORE COMPLEX CONTROL ALGORITHMS NECESSARY TO MEET GOVERNMENTAL FUEL-ECONOMY AND EMISSION REQUIREMENTS. USING A TWO-BOARD MICROPROCESSOR MODULE AS A GUIDE, A PERFORMANCE SPECIFICATION FOR A MICROPROCESSOR SYSTEM WAS WRITTEN AND RELEASED TO SEVERAL MAJOR SEMICONDUCTOR MANUFACTURERS. THIS SPECIFICATION INCLUDED THE REQUIREMENT TO OPERATE AT 4 VOLTS FOR LOW BATTERY CRANKING AND AN OPERATING TEMPERATURE RANGE OF MINUS 40° C TO PLUS 125° C. A SPECIFICATION OF THE ALGORITHM AND COMPUTATION CYCLE TIME DEFINED THE CHARACTERISTICS OF THE PROCESSOR. THIS NEW MICROPROCESSOR-BASED MODULE WAS CONSTRAINED TO PERFORM IDENTICALLY TO THE 78 MY VERSION OF A CUSTOM ANALOG SPARK CONTROL UNIT WHICH HAS LESS THAN 120 PARTS COMPARED TO THE ORIGINAL 200 IN THE PRODUCTION SPARK CONTROL MODULE. THE ELECTRONIC COMPONENTS ARE MOUNTED ON ONE PC BOARD THE IDENTICAL SIZE OF THE CUSTOM ANALOG MODULE WITH A TOTAL PARTS COUNT OF 75 COMPONENTS INCLUDING SIX IC'S CONSISTING OF A QUAD COMPARATOR, A CUSTOM I/O CHIP, A 32 BYTE RAM, A 1024 BYTE ROM, AND A SMALL PROM. THE DIGITAL SPARK CONTROL COMPUTER WITH PROM REPRESENTS A MAJOR IMPROVEMENT COMPARED TO AN ORIGINAL VERSION. THIS SMALL FUSIBLE LINK MEMORY IS USED AS A MODIFIER TO THE PRIMARY CONTROL ALGORITHM. WITH THIS PROM, ALL FOUR-CYLINDER, SIX-CYLINDER AND EIGHT-CYLINDER ENGINE APPLICATIONS CAN BE IMPLEMENTED WITHOUT REQUIRING A NEW ROM. THIS FEATURE ALLOWS THE ENGINE DESIGNERS TO MODIFY THE OPERATING CHARACTERISTICS WITHOUT CHANGING THE ROM PATTERN. THIS SPARK CONTROL COMPUTER HAS BEEN EXTENSIVELY TESTED AND FOUND TO BE AS RELIABLE AS THE PRODUCTION SYSTEM AND REPRESENTS THE NEXT GENERATION OF ELECTRONIC ENGINE CONTROL SYSTEMS.

by JOHN LAPPINGTON; LAVERNE A. CARON
CHRYSLER CORP.
Publ: HS-022 991 (SAE-SP-426), "MICROPROCESSOR CONTROLLER DEVELOPMENTS," WARRENDALE, PA., 1978 P11-4
Rept. No. SAE-780117; 1978
Availability: IN HS-022 991

HS-022 994

A PRACTICAL APPLICATION OF MICROPROCESSORS IN THE AUTOMOTIVE ENVIRONMENT

THE BASIC DESIGN CONSTRAINTS AND DIRECTIONAL DECISIONS WHICH LEAD TO THE DESIGN OF FORD MOTOR CO.'S FIRST MICROPROCESSOR-BASED ELECTRONIC ENGINE CONTROL SYSTEM

ARE REVIEWED; AND A NUMBER OF GENERAL OBSERVATIONS MADE AS A RESULT OF THE DESIGN IN THE AREAS OF MICROPROCESSOR SELECTION, COST PARTITIONING, AND DESIGN OBJECTIVES. THE DESIGN CONSTRAINTS ARE CATEGORIZED AS EXTERNAL AND INTERNAL. THE EXTERNAL INFLUENCES ON A DESIGN ARE OFTEN THE MOST EASY TO IDENTIFY, BUT THE MOST DIFFICULT TO CHARACTERIZE FOR PRODUCT ENGINEERING. IN THE CASE OF ELECTRONIC ENGINE CONTROLS, THESE EXTERNAL INFLUENCES ARE IN THE FORM OF FEDERAL LEGISLATION OF EMISSION AND FUEL ECONOMY REQUIREMENTS. THE INTERNAL COMPANY CONSIDERATIONS THAT INFLUENCE THE DESIGN OF AN ELECTRONIC ENGINE CONTROL SYSTEM ARE LARGELY DEPENDENT ON THE VEHICLE APPLICATION. THESE INTERNAL CONSIDERATIONS ARE GENERALLY WELL DEFINED FOR EACH ENGINEERING PROGRAM IN THE FORM OF PRODUCT SPECIFICATIONS AND INCLUDE PACKAGEABILITY, WEIGHT, SERVICEABILITY, AND ENVIRONMENT. THE FORD ELECTRONIC ENGINE CONTROL SYSTEM, THE EEC-1, INTRODUCED DURING THE 1978 MODEL YEAR IS DESCRIBED. IT IS BASED ON A 12 BIT WORD MICROPROCESSOR DEVELOPED FOR THE PARTICULAR APPLICATION. THE PRIMARY FUNCTION OF THE SYSTEM IS TO CONTROL SPARK ADVANCE ANGLE, EGR (EXHAUST GAS RECIRCULATION) FLOW INTO THE INTAKE MANIFOLD AND THE SECONDARY AIR PUMP VALVE, BY SENSED ENGINE PARAMETERS ACCORDING TO A PREPROGRAMMED STRATEGY AND CALIBRATION. THE SYSTEM IS PARTITIONED INTO THE FOLLOWING TWO ASSEMBLIES: THE GENERAL PURPOSE PROCESSOR ASSEMBLY CONTAINING THE MICROPROCESSOR, SENSOR INTERFACE CIRCUITRY, ACTUATOR CONTROLS, AND POWER SUPPLIES; AND THE CALIBRATION ASSEMBLY CONTAINING THE STRATEGY ROM. FROM THE EXPERIENCE GAINED IN THIS DESIGN PROJECT, IT IS CONCLUDED THAT THE SELECTION OR DESIGN OF THE MICROPROCESSOR FOR AN ENGINE CONTROL SYSTEM IS CRITICAL BUT IS NOT THE TOTAL TASK IN THE DEVELOPMENT OF SUCH A SYSTEM. ALSO, A LARGE PORTION OF THE COST OF AN ELECTRONIC ENGINE CONTROL SYSTEM IS DEDICATED IN COMPONENTS REQUIRED TO SUPPORT THE MICROPROCESSOR RATHER THAN THE MICROPROCESSOR ITSELF.

by G. CILIBRAISE
FORD MOTOR CO., ELECTRICAL AND ELECTRONICS DIV.
Publ: HS-022 991 (SAE-SP-426), "MICROPROCESSOR CONTROLLER DEVELOPMENTS," WARRENDALE, PA., 1978 P15-20
Rept. No. SAE-780119; 1978
Availability: IN HS-022 991

HS-022 995

SINGLE CHIP MICROCOMPUTERS IN AUTOMOTIVE SYSTEMS

COMPUTING POWER AND MEMORY SIZE IN GENERAL PURPOSE, SINGLE CHIP MICROCOMPUTERS ARE PROGRESSIVELY INCREASING; THESE DEVICES CAN PROVIDE COST-EFFECTIVE SOLUTIONS IN MANY AUTOMOTIVE SYSTEMS. PARALLEL WITH THE DEVELOPMENT OF HIGH-PERFORMANCE

SINGLE CHIP MICROCOMPUTERS, THERE ARE SIMPLER, LOWER PERFORMANCE DEVICES BEING INTRODUCED. THESE MICROCOMPUTERS EMPHASIZE EXTREMELY LOW COST, WHILE RETAINING A CONVENTIONAL EIGHT-BIT MICROCOMPUTER ARCHITECTURE. SPECIAL PURPOSE, SINGLE CHIP MICROCOMPUTERS WILL BE DEVELOPED WHICH MINIMIZE COST IN SPECIFIC APPLICATIONS. THE PROLIFERATION OF DIFFERENT TYPES OF SINGLE CHIP MICROCOMPUTERS, AND THEIR DECREASING COST WILL MAKE MULTIPLE, DECENTRALIZED MICROCOMPUTER SYSTEMS AROUND THE AUTOMOBILE PRACTICAL. ELECTRICALLY PROGRAMMABLE, UV ERASABLE ROMS (EPROMS) ARE A PRACTICAL ALTERNATIVE TO MASK PROGRAMMED ROMS IN AUTOMOTIVE SYSTEMS.

by BRIAN KNOWLES; GENE HILL; CHESTER SILVESTRI; RICHARD RUBINSTEIN
INTEL MICROCOMPUTER COMPONENTS DIV.
Publ: HS-022 991 (SAE-SP-426), "MICROPROCESSOR CONTROLLER DEVELOPMENTS," WARRENDALE, PA., 1978 P21-9
Rept. No. SAE-780120; 1978
Availability: IN HS-022 991

HS-022 996

MANAGING AUTOMOTIVE MICROPROCESSOR INTERFACES

THE ABILITY OF MICROPROCESSORS TO RESPOND TO THE CHALLENGE OF UTILIZATION IN AN INCREASING PROPORTION OF ENGINE CONTROL TASKS RESTS LARGELY ON COMMUNICATIONS. ESTABLISHMENT OF STANDARDS FOR TIMING, INTERCONNECTION, AND PROTOCOL ARE A NECESSARY BUT NOT SUFFICIENT CONDITION FOR THE ORDERLY DEVELOPMENT OF COMPATIBLE SUPPORT PRODUCTS EMPLOYING DIFFERENT TECHNOLOGIES. TECHNIQUES FOR AVOIDING COMMUNICATION BOTTLENECKS ARE CONSIDERED FOR THE FOLLOWING AREAS: ENGINE AND DRIVE TRAIN, SPARK CONTROL, A-D CONVERSION, AND DISPLAY CONTROL. THE CONCEPT OF SEMI-INTELLIGENT PERIPHERALS THROUGH FUNCTIONAL ENRICHMENT IS PROPOSED, IT BEING DERIVED BY APPLYING MANAGEMENT THINKING TO MICROPROCESSOR CONTROL SYSTEMS. EARLY CONSIDERATION OF THIS PHILOSOPHY WILL ALLOW DEVELOPMENT OF COMMUNICATION CHANNELS AND DATA FLOW FORMATS THAT WILL ENABLE SYSTEM GROWTH WITHOUT THE TRAUMATIC REORGANIZATIONAL CRISES THAT BESET ILL-CONCEIVED ORGANIZATIONS. ESTABLISHMENT OF TOTAL SYSTEM OBJECTIVES IS KEY TO DEVELOPMENT OF DIVISIONAL AND DEPARTMENTAL DEFINITIONS AND RESPONSIBILITIES. IT IS THEN POSSIBLE TO LOCALIZE THE CHOICE OF TECHNOLOGY USED TO MEET THE DEPARTMENTAL OBJECTIVES AND RESPONSIBILITIES. EXPANDED FUNCTIONS ALLOW GREATER FLEXIBILITY AND COST EFFECTIVENESS AND THIS DELEGATION OF ROUTINE TO THE DEPARTMENTS ALLOWS THE DATA PROCESSOR TO ORCHESTRATE A GROWING NUMBER OF FUNCTIONS WITHOUT THE NEED FOR TECHNOLOGICAL BREAKTHROUGHS EACH AND EVERY MODEL YEAR. BUT WHEN TECHNOLOGICAL BREAKTHROUGHS DO OCCUR, THE

HS-022 997

HSL 78-10

STANDARDIZATION OF FORMATS AND INTERFACES WILL PERMIT THEIR EARLY ADOPTION.

by DAVID K. LONG
NATIONAL SEMICONDUCTOR
Publ: HS-022 991 (SAE-SP-426), "MICROPROCESSOR
CONTROLLER DEVELOPMENTS," WARRENDALE, PA.,
1978 P31-9
Rept. No. SAE-780121; 1978; 16REFS
Availability: IN HS-022 991

HS-022 997

SIMPLIFICATION OF SYSTEM INPUTS AND OUTPUTS FOR MPU CONTROL UNITS [MICROCOMPUTERS]

THE COST OF MEMORY WITHIN MICROCOMPUTER CONTROLLERS CONTINUES TO FALL WITH ADVANCES IN SEMICONDUCTOR TECHNOLOGIES FOR LARGE-SCALE INTEGRATION. COST-EFFECTIVENESS CAN BE IMPROVED, THEREFORE, BY SIMPLIFYING THE DESIGN AND SPECIFICATION OF ACTUATORS AND SENSORS AND BY COMBINING INFORMATION TO FORM A MORE COMPLEX SIGNAL WHEREVER POSSIBLE TO SAVE WIRES AND CONNECTIONS. SOME METHODS ARE SUGGESTED FOR ORGANIZING SIMPLE AUTOMOTIVE SENSOR AND ACTUATOR ELEMENTS TO MINIMIZE WIRES AND USE THE ANALYTICAL CAPABILITY OF THE PROGRAM OF INSTRUCTIONS STORED WITHIN THE MEMORY OF THE ELECTRONIC CONTROLLER TO EXTRACT INFORMATION OR MANIPULATE THE ACTUATORS. AN INFORMATION EXCHANGE SYSTEM BETWEEN MICROCOMPUTER CONTROL UNITS IS DESCRIBED WHICH ALLOWS TRADING OF INFORMATION. THE SHARING OF INFORMATION IS ACCOMPLISHED THROUGH THE USE OF AN UNSHIELDED PAIR OF SERIAL DATA EXCHANGE WIRES. DUPLICATION OF SENSORS CAN BE AVOIDED, EACH SENSOR CAN BE CONNECTED TO THE CLOSEST CONTROLLER TO SHORTEN WIRE LENGTHS, AND THE WIRE HARNESS BETWEEN THE INSTRUMENT PANEL AND THE ENGINE COMPARTMENT CAN BE SIMPLIFIED.

by JOHN MARLEY
MOTOROLA INC., INTEGRATED CIRCUITS DIV.
Publ: HS-022 991 (SAE-426), "MICROPROCESSOR
CONTROLLER DEVELOPMENTS," WARRENDALE, PA.,
1978 P41-6
Rept. No. SAE-780123; 1978
Availability: IN HS-022 991

HS-022 998

AUTOMOTIVE CONTROL DEVELOPMENT SYSTEM [MICROPROCESSOR]

A MICROPROCESSOR-BASED SYSTEM CAN BE USED AS A DEVELOPMENT TOOL BY THE AUTOMOTIVE ENGINEER TO TEST AND EVALUATE A MULTITUDE OF AUTOMOTIVE CONTROL CONCEPTS EASILY AND QUICKLY. THE OPERATOR REQUIRES LITTLE KNOWLEDGE OF COMPUTERS OR MICROPROCESSORS AND ONLY NEEDS TO OPERATE THE PERIPHERALS SUCH AS A KEYBOARD, DISPLAY, AND PRINTER. THE DEVELOPMENT SYSTEM PROVIDES A SIMPLIFIED MEANS OF PROGRAM DEBUGGING, THE CAPABILITY

TO MODIFY DATA AND PROGRAM FUNCTIONS DURING OPERATION AND EVALUATION, AND THE CAPABILITY TO ACCUMULATE AND STORE EVALUATION DATA. THE EQUIPMENT ASSOCIATED WITH THIS DEVELOPMENT SYSTEM IS DIVIDED INTO TWO PORTIONS. ONE PORTION CONTROLS THE VEHICLE OPERATION AND INTERFACES WITH THE AUTOMOTIVE SENSORS AND ACTUATORS; THE OTHER PORTION CONTROLS THE OPERATOR INTERFACE DEVICES WHICH INCLUDE THE KEYBOARD, DISPLAY, PRINTER, AND OTHER PERIPHERAL UNITS. THE VEHICLE EQUIPMENT HAS BEEN DESIGNED TO OPERATE ON VEHICLE BATTERY POWER. AFTER THE CONTROL ALGORITHM HAS BEEN DETERMINED USING THE DEVELOPMENT SYSTEM, THE CONTENTS OF THE SYSTEM MEMORY CAN BE TRANSFERRED TO A ROM DEVICE FOR THE PRODUCTION AUTOMOTIVE CONTROLLER. THEREFORE, THE SYSTEM IS USEFUL IN ALL PHASES OF PRODUCT DEVELOPMENT FROM THE INITIAL CONCEPT STAGE TO PRODUCTION.

by T. R. SCHLAX; J. T. AUMAN
GENERAL MOTORS TECHNICAL CENTER, ADVANCE
PRODUCT ENGINEERING, WARREN, MICH.
Publ: HS-022 991 (SAE-SP-426), "MICROPROCESSOR
CONTROLLER DEVELOPMENTS," WARRENDALE, PA.,
1978 P47-58
Rept. No. SAE-780433; 1978; 26REFS
Availability: IN HS-022 991

HS-022 999

PULSE MODULATION A/D CONVERTER [MICROPROCESSOR]

THE MECHANIZATION OF A SINGLE CHIP CMOS ANALOG TO DIGITAL (A/D) CONVERTER USING A PULSE WIDTH MODULATION TECHNIQUE IS DESCRIBED. THE PULSE MODULATION TECHNIQUE, COUPLED WITH A UNIQUE COMPARATOR DESIGN, TAKES ADVANTAGE OF THE LOGIC DENSITY AND THE ZERO OFFSET SWITCH INHERENTLY AVAILABLE IN CMOS. A DETAILED BLOCK DIAGRAM IS PRESENTED AS WELL AS IMPORTANT CIRCUIT CONSIDERATIONS. ALTHOUGH THE MAIN OBJECTIVE OF THIS RESEARCH WAS THE INTEGRATION OF A 3.5-DIGIT VOLT METER ON A SINGLE MONOLITHIC DEVICE, THE APPLICATION OF THE TECHNIQUE TO DISCRETE SOLUTIONS WORKING IN CONJUNCTION WITH MICROPROCESSORS IS BRIEFLY EXPLORED AS WELL. THE FINISHED PRODUCT, A 3.5-DIGIT VOLT METER CHIP, IS BRIEFLY DESCRIBED AS AN EXAMPLE OF THE PRACTICALITY OF THE PULSE WIDTH MODULATION TECHNIQUE.

by THOMAS P. REDFERN
NATIONAL SEMICONDUCTOR CORP., STANDARD
LINEAR INTEGRATED CIRCUIT DESIGN, SANTA
CLARA, CALIF.
Publ: HS-022 991 (SAE-SP-426), "MICROPROCESSOR
CONTROLLER DEVELOPMENTS," WARRENDALE, PA.,
1978 P59-62
Rept. No. SAE-780435; 1978
Availability: IN HS-022 991

HS-023 000

A STUDY OF 171 MOTORBIKE ACCIDENTS. FINAL REPORT (ETUDE DE 171 ACCIDENTS DE CYCLOMOTORISTES. RAPPORT FINAL)

RESULTS OF A STUDY OF 171 MOTORCYCLE ACCIDENTS WHICH OCCURRED IN URBAN AND RURAL AREAS OF FRANCE DURING 1976 ARE PRESENTED. THE MAIN OBJECTIVES OF THIS STUDY WERE AS FOLLOWS: TO CLASSIFY THE MOTORCYCLE INJURIES ACCORDING TO FREQUENCY AND SEVERITY AND SOURCE OF INJURY (E.G. IMPACT WITH GROUND, IMPACT WITH VEHICLE), TO ESTABLISH THE MOST FREQUENTLY OCCURRING AND MOST SERIOUS TYPES OF CAR/MOTORCYCLE COLLISIONS AND COMMENT ON THE VIOLENCE OF THE IMPACTS, AND TO EVALUATE HOW EFFECTIVELY THE VARIOUS TYPES OF HELMETS CAN PROTECT THE MOTORCYCLE RIDER. IT WAS FOUND THAT 58% OF THE ACCIDENTS OCCURRED AT AN INTERSECTION AND WERE MOST OFTEN CAUSED BY FAILURE TO YIELD THE RIGHT OF WAY BOTH ON THE PART OF THE MOTORCYCLIST AND THE MOTORIST. OF THE ACCIDENTS, 27% OCCURRED AT NIGHT AND, ON THE WHOLE, WERE THE MOST SEVERE TYPE OF ACCIDENT; THE OVERALL INJURY SEVERITY INDEX (INJURY SEVERITY SCORE, ISS) WAS ON THE AVERAGE 60% HIGHER. THERE WERE SIX TIMES MORE FATALITIES IN RURAL ACCIDENTS THAN URBAN ACCIDENTS. COLLISIONS BETWEEN MOTORCYCLES AND CARS WERE THE MOST FREQUENT (74%), BUT THEY WERE NOT THE MOST SEVERE, COMPARED TO COLLISIONS WITH VANS, TRUCKS AND FIXED OBSTACLES. WITH RESPECT TO KINEMATICS OF THE MOTORCYCLISTS, 46% OF THE RIDERS COLLIDED OUTRIGHT WITH THE OBSTACLE, 28% FELL TO THE GROUND (NO OBSTACLE PRESENT), AND 25% AVOIDED AN OBSTACLE AND FELL TO THE GROUND. THE PRINCIPAL INJURY WAS CAUSED BY IMPACT WITH A CAR IN 46% OF THE CASES AND IMPACT WITH THE GROUND IN 41% OF THE CASES. THE ANATOMICAL REGIONS WHICH WERE MOST OFTEN INJURED WERE AS FOLLOWS: HEAD (79%), LOWER LIMBS (73%), AND UPPER LIMBS (45%). IMPACT SITES ON THE HEAD WERE MOSTLY FRONTAL (77% OF THE CASES) WHEN THE INJURIES WERE MINOR. INJURIES BECAME INCREASINGLY LATERAL AS THE DEGREE OF SEVERITY INCREASES. THE PROTECTION OFFERED BY HELMETS CURRENTLY IN USE AMONG RIDERS UNDER 30 YEARS OF AGE DOES NOT MAKE UP FOR THE INCREASED VIOLENCE OF THE COLLISIONS IN WHICH THEY ARE INVOLVED. PROBLEMS ASSOCIATED WITH CURRENT HELMETS ARE AS FOLLOWS: NO SHOCK-ABSORBING MATERIAL IN HALF THE CASES; DESIGN ACCORDING TO INADEQUATE STANDARDS (MAXIMAL PROTECTION AT THE TOP OF THE HEAD); NO PROTECTION AFFORDED TO TEMPORAL REGIONS BY THE "BOWL"-TYPE HELMETS; LOSS OF HELMETS IN 25% OF THE CASES, HALF OF WHICH LOST BEFORE THE MAIN IMPACT; AND NO FRONTO-FACIAL PROTECTION.

by C. THOMAS; J. -Y. FORET-BRUNO; C. HENRY; G. FAVERJON; C. TARRIERE
ASSOCIATION PEUGEOT-RENAULT, LABORATOIRE DE PHYSIOLOGIE ET DE BIOMECHANIQUE, 18 RUE DES

FAUVELLES, 92250 LA GARENNE, COLOMBES, FRANCE
76-00-244
1977; 203P 17REFS
TEXT ALSO IN FRENCH.
Availability: TECHTRAN CORP., P.O. BOX 729, GLEN BURNIE, MD.

HS-023 001

RADIAL TIRE COMPARISON TEST. WHICH IS THE RIGHT TIRE FOR YOU?

AS A GUIDE TO SELECTING CAR TIRES, RESULTS OF TESTING 165R-13 RADIALS (OR THE EQUIVALENT) FROM 22 MANUFACTURERS ARE PRESENTED. THE FOLLOWING COMPANIES ARE REPRESENTED: AVANTI, BARUM, BRIDGESTONE, CEAT, CONTINENTAL, COOPER, DUNLOP, GISLAVED, GOODRICH, GOODYEAR, KLEBER, METZELER, MICHELIN, PHOENIX, PIRELLI, SEARS ROEBUCK, SEMPERIT, TOYO, UNIROYAL, VELOCE, VREDESTEIN, AND YOKOHAMA. GRAPHS PROVIDE THE FOLLOWING COMPARATIVE INFORMATION: BRAKING DISTANCE FROM 60 MPH (DRY PAVEMENT), BRAKING DISTANCE FROM 60 MPH (WET PAVEMENT), SLALOM SPEED (DRY PAVEMENT), NOISE EVALUATION, RIDE EVALUATION, WET SKIDPAD (LATERAL ACCELERATION), AND DRY SKIDPAD (LATERAL ACCELERATION). A TIRE COMPARATOR TABLE PROVIDES THE FOLLOWING INFORMATION: CONTACT PATCH, MAXIMUM TREAD WIDTH, STEEL BELT WIDTH, WEIGHT, TREAD CONSTRUCTION, SIDEWALL CONSTRUCTION, LOAD-CARRYING CAPACITY, MOLDING PROCESS, AND COUNTRY OF MANUFACTURE. A HIGH-SPEED EVALUATION TABLE PROVIDES THE FOLLOWING DATA: RUNNING TIME AT 112 MPH (MAX 60 MIN), RUNNING TIME AT 118 MPH (MAX 30 MIN), RUNNING TIME AT 118 MPH (90% OF MAX LOAD), AND TYPE OF FAILURE (TREAD SEPARATION, BLOWOUT). FINALLY, TIRE DESCRIPTIONS AND PICTURES OF TREAD PATTERNS ARE PRESENTED.

by JOHN DINKEL
Publ: ROAD AND TRACK V29 N2 P71-86 (OCT 1977)
1977; 1REF
Availability: SEE PUBLICATION

HS-023 002

MANAGED SECONDARY AIR--A MEANS OF ACHIEVING SULFATE EMISSION CONTROL WITH CATALYST EQUIPPED VEHICLES

SIMILAR TO THREE-WAY CATALYSTS (TWC), CONVENTIONAL OXIDATION CATALYSTS (COC) HAVE A "CONTROL WINDOW" WITH RESPECT TO INLET OXYGEN (O₂) CONCENTRATIONS. WITHIN THIS WINDOW, WHICH IS BORDERED ON ONE SIDE BY POOR HYDROCARBON/CARBON MONOXIDE (HC/CO) EFFICIENCY AND LOW SULFATE FORMATION AND ON THE OTHER SIDE BY GOOD HC/CO EFFICIENCY AND HIGH SULFATE FORMATION, IS A REGION OFFERING SIMULTANEOUS CONTROL OF HC, CO, AND SULFATES. STARTING WITH AN ADVANCED EMISSION CONTROL SYSTEM, WHICH INCORPORATES TWC WITH AN O₂ SENSOR AND CLOSED-LOOP FEED-

HS-023 003

BACK CONTROL OF THE AIR-FUEL RATIO (A/F) FOLLOWED BY A COC WITH SECONDARY AIR ADDITION FOR ADEQUATE CONTROL OF HC AND CO, AN ADDITIVE CONTROL SYSTEM HAS BEEN DESIGNED WHICH MAINTAINS A CONSTANT O₂ LEVEL AT THE INLET OF THE OXIDATION CATALYST. WITH THE NEARLY CONSTANT COMPOSITION OF THE EXHAUST GASES OF AN ENGINE WITH STOICHIOMETRIC A/F CONTROL, THE QUANTITY OF SECONDARY AIR ADDITION REQUIRED TO ACHIEVE THIS CONSTANT O₂ LEVEL IS A LINEAR FUNCTION OF ENGINE AIR FLOW. USING INPUTS OF MANIFOLD ABSOLUTE PRESSURE (MAP) AND ENGINE SPEED, AN ELECTRIC MOTOR SERVO CONTROL SYSTEM WAS DESIGNED TO CONTROL THE FLOW OF SECONDARY AIR TO THE OXIDATION CATALYST ON A 2.3 LITER, STANDARD TRANSMISSION VEHICLE. EXHAUST EMISSION AND SULFATE RESULTS FOR THE VEHICLE ARE PRESENTED, RESPECTIVELY, FOR THE CVS-C/H AND THE CONGESTED FREEWAY DRIVING SCHEDULE (CFDS) TEST PROCEDURES. DETAILS OF THE ELECTRONIC SERVO CONTROL SYSTEM ARE APPENDED. IT WAS DEMONSTRATED THAT THE CONTROL SYSTEM CAN MAINTAIN CLOSE TOLERANCE CONTROL OF THE EXHAUST OXYGEN LEVEL, THAT A REDUCED AND CONTROLLED LEVEL OF EXHAUST OXYGEN RESULTS IN REDUCED SULFATE EMISSIONS AND INCREASED EXHAUST GAS TEMPERATURES, THAT A NOMINAL EXHAUST OXYGEN LEVEL OF 2% TO 3% PROVIDES A RESPECTIVE 80% TO 70% REDUCTION IN SULFATE EMISSION WITH NO LOSS IN HC AND NITROGEN OXIDES AND ONLY A SMALL INCREASE IN CO, AND THAT CFDS SULFATE RESULTS ARE SIMILAR FOR BOTH THE SET 7 AND SET 7D TEST PROCEDURES.

by L. HIDEK; E. M. HOYT; J. H. JONES; C. E. ZAKRAJSEK
FORD MOTOR CO., ENGINEERING AND RES. STAFF
Rept. No. SAE-770296; 1977; 22P 17REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAY 1977.
Availability: SAE

HS-023 003

VEHICLE PRIMARY SAFETY RESEARCH. DRIVER BEHAVIOUR STUDIES. FINAL REPORT

AN EXTENSIVE SERIES OF TRACK TESTS WAS DESIGNED TO EXAMINE DRIVER RESPONSE TO AN EXPERIMENTALLY INDUCED LOSS OF CONTROL SITUATION. ORIGINAL DATA ANALYSES THAT WERE COMPLETED ON THE DRIVER DATA DURING THE TWO-YEAR STUDY PERIOD ARE EXTENDED AND DEVELOPED, AND A CRITICAL EXAMINATION OF THE TEST PROGRAM AS A WHOLE IS PRESENTED. CHAPTER 1 PROVIDES BACKGROUND INFORMATION ON THE SEVEN DRIVER EXPERIMENTS. THE NEXT TWO CHAPTERS EXAMINE IN DEPTH THE DRIVER DATA THAT WERE OBTAINED FROM THE TWO MAJOR EXPERIMENTS OF THE PROGRAM, A LOSS OF CONTROL EXPERIMENT (UNEXPECTED AND TEMPORARY LOCKING OF THE REAR WHEELS OF TEST VEHICLE) AND A TIRE DEFLATION EXPERIMENT. CHAPTER 4 PRESENTS A CRITICAL OVERVIEW OF THE TWO-YEAR TEST PROGRAM, FOCUSING ON THE

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ADVANTAGES AND DISADVANTAGES OF CARRYING OUT SUCH TESTS. A SUMMARY OF THE TECHNICAL EQUIPMENT AND TEST VEHICLES THAT WERE USED DURING THE TESTS IS PRESENTED IN THE FINAL CHAPTER.

CRANFIELD INST. OF TECH., SCHOOL OF AUTOMOTIVE STUDIES, CRANFIELD, BEDFORD MK43 0AL, ENGLAND
TRRL-842/116
1976; 166P 32REFS
REPT. FOR APR 1974-APR 1976.
Availability: CORPORATE AUTHOR

HS-023 004

FUNDAMENTAL STUDY OF OXIDATION IN A LEAN THERMAL REACTOR

THE OXIDATION MECHANISM IN A LEAN THERMAL REACTOR WAS STUDIED WITH A NUMBER OF BASIC EXPERIMENTS. IT WAS FOUND THAT OXIDATION DEPENDS ON THE PASSAGE TIME OF THE GAS THROUGH THE REACTOR, RATHER THAN ON ENGINE SPEED OR AIRFLOW RATE. IN A LEAN THERMAL REACTOR, CARBON MONOXIDE (CO) FIRST INCREASES DUE TO HYDROCARBON (HC) CONVERSION TO CO AND THEN DECREASES DUE TO OXIDATION OF CO TO CARBON DIOXIDE (CO₂). THE OXIDATION REACTION IS SLOW IN A LEAN THERMAL REACTOR, REQUIRING 50 MSEC FOR CO TO REACH PEAK CONCENTRATION AT 700° C AND 100 MSEC TO DECREASE NEARLY TO ZERO. THERE IS LITTLE HEAT RELEASE COMPARED TO THAT OF A RICH THERMAL REACTOR AND THE HEAT RELEASE STARTS FROM DOWNSTREAM OF THE REACTOR. OXIDATION IS AFFECTED BY NITRIC OXIDE (NO) AND THERE EXISTS A CERTAIN NO CONCENTRATION WHICH MOST ACCELERATES OXIDATION.

by YASUO SAKAI; YASUHIKO NAKAGAWA; SHOJI TANGE; RYUZABURO MARUYAMA
NISSAN MOTOR CO., LTD., CENTRAL ENGINEERING LABS., JAPAN
Rept. No. SAE-770297; 1977; 12P 4REFS
PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977.
Availability: SAE

HS-023 005

COMPUTER SIMULATION OF VEHICLE BEHAVIOUR IN POTENTIAL LOSS OF CONTROL SITUATIONS. FINAL REPORT

THE DEVELOPMENT IS DESCRIBED OF A VEHICLE HANDLING SIMULATION TO RESPOND TO DRIVER CONTROL MOVEMENTS, SUCH AS BRAKING, STEERING, AND THE OPERATION OF THROTTLE AND CLUTCH. THE SIMULATION UTILIZES A COMPUTER GRAPHICS DISPLAY TERMINAL. A MATHEMATICAL MODEL WAS DEVELOPED TO SIMULATE VEHICLE MOTIONS AT LIMIT PERFORMANCE AND SPIN-OUT CONDITIONS. VALIDATION OF THE SIMULATION IS ILLUSTRATED AGAINST DATA FROM TESTS ON A MORRIS 1300 WITH MICHELIN ZX TIRES. TWO EXERCISES ARE DESCRIBED THAT REVEAL THE SIMULA-

October 31, 1978

HS-023 008

TION'S CAPABILITY TO STUDY DRIVER/VEHICLE INTERACTION. FUTURE USES OF THE SIMULATION ARE ENVISIONED AS RECONSTRUCTION OF SINGLE VEHICLE ACCIDENTS, SIMULATION OF VEHICLE TO VEHICLE IMPACTS, DRIVER MODELING, AND VEHICLE PERFORMANCE ON VARIABLE FRICTION SURFACES.

by J. R. ELLIS; P. L. READ
CRANFIELD INST. OF TECH., CRANFIELD SCHOOL OF
AUTOMOTIVE STUDIES, CRANFIELD, BEDFORD MK43
0AL, ENGLAND
TRRL-842/116
1977; 64P 3REFS
REPT. FOR 1 APR 1976-31 MAR 1977.
Availability: CORPORATE AUTHOR

HS-023 006

DEVELOPMENT OF THE FMVSS [FEDERAL MOTOR VEHICLE SAFETY STANDARD] 105/75 BRAKE TEST SYSTEM

THE DEVELOPMENT AND USE IS DISCUSSED OF A SYSTEM CONSISTING OF A DATA ACQUISITION/CONTROL PROCESSOR AND A SERVO HYDRAULIC BRAKE ACTUATOR. THIS BRAKE TEST SYSTEM ALLOWS A SINGLE DRIVER TO PERFORM THE TEST SPECIFIED IN FEDERAL MOTOR VEHICLE SAFETY STANDARD (FMVSS) 105/75, AND PROVIDES HARD-COPY DOCUMENTATION OF TEST RESULTS FOR DEVELOPMENT AND CERTIFICATION. TRANSDUCERS MOUNTED ON THE VEHICLE MONITOR VEHICLE VELOCITY, DISTANCE TRAVELED, DECELERATION, BRAKE PEDAL FORCE, WHEEL VELOCITY, AND BRAKE TEMPERATURES. THE DATA ACQUISITION UNIT, UTILIZING A MICROPROCESSOR, MONITORS AND OUTPUTS TO A DIGITAL PRINTER THE STOPPING DISTANCE, INTERVAL DISTANCE BETWEEN TESTS, INITIAL STOPPING VELOCITY, MAXIMUM AND MINIMUM PEDAL FORCE, MINIMUM DECELERATION, PRETEST BRAKE TEMPERATURES, AND WHEEL LOCK INFORMATION. A DASHBOARD-MOUNTED DRIVER'S DISPLAY PROVIDES DIGITAL READOUTS OF THE ABOVE-MENTIONED PARAMETERS AND ALSO PROVIDES ANALOG DISPLAYS OF VEHICLE DECELERATION OR BRAKE PEDAL FORCE AND VEHICLE SPEED. THE SERVO-HYDRAULIC BRAKE PEDAL ACTUATOR, MODEL 11 BRAKE TEST INSTRUMENT, IS A FIFTH GENERATION DEVICE WHICH CAN PROVIDE CONSTANT FORCE, RAMP FORCE, OR CONSTANT DECELERATION MODES, SINGLY OR IN COMBINATION. THE MODE SWITCHING FEATURE IS UTILIZED TO CONDUCT THE VARIOUS BRAKE TESTS REQUIRED BY THE FEDERAL STANDARD.

by RONALD J. CHAKA; RONALD J. WILLETT
GENERAL MOTORS PROVING GROUND,
INSTRUMENTATION ENGINEERING DEPT., MILFORD,
MICH.
Rept. No. GM-SP-A-7387; 1978; 16P
Availability: CORPORATE AUTHOR

HS-023 007

MOTORCYCLE EMISSION CONTROL DEMONSTRATION. FINAL REPORT

IN ORDER TO GENERATE DATA ON THE EFFECTIVENESS OF AVAILABLE MOTORCYCLE EMISSION CONTROL TECHNOLOGY, TEN MOTORCYCLES WERE SELECTED FOR TESTING ON THE BASIS OF SALES DATA AND ENGINE DESIGN. THE TWO-STROKE MOTORCYCLES CHOSEN WERE THE SUZUKI GT-750, KAWASAKI KH-500, YAMAHA RD-400C, KAWASAKI KE-175, AND SUZUKI TS-100. THE FOUR-STROKE MOTORCYCLES WERE THE HONDA GL-1000, KAWASAKI KZ-90, SUZUKI RE-5 (ROTARY), HONDA CB-360T, AND HONDA XL-125. ALL TESTING WAS PERFORMED WITH LOW ACCUMULATED MILEAGE ON THE MOTORCYCLES. APPLIED SINGLY AND IN COMBINATION, "PROOF OF PRINCIPLE" DEMONSTRATIONS WERE CONDUCTED ON CARBURETOR ENLEANMENT, CAPACITIVE-DISCHARGE IGNITION, AIR INJECTION BY REED VALVE AND BY PUMP, CATALYSTS, THERMAL REACTORS, PORT LINERS, ROTARY VALVE MODIFICATIONS, AND A SPARK-IGNITED AFTER-BURNER. MOST OF THE EMISSION CONTROL TECHNIQUES WERE APPLIED TO TWO OR MORE MACHINES TO DETERMINE THE SENSITIVITY OF CONTROL MEASURES TO ENGINE SIZE AND TYPE. THE PRIMARY TEST PROCEDURE USED TO DETERMINE CONTROL EFFECTIVENESS WAS THE 1975 MOTORCYCLE FEDERAL TEST PROCEDURE (FTP), WITH CORRESPONDING HIGHWAY FUEL ECONOMY TESTS (FETS) CONDUCTED IN AS MANY CASES AS POSSIBLE. STEADYSTATE EMISSION MEASUREMENTS WERE CONDUCTED WHENEVER NECESSARY TO SET UP OR DOCUMENT THE PERFORMANCE OF EMISSION CONTROL MEASURES. PERFORMANCE EVALUATIONS INCLUDED 0-100 KPH ACCELERATIONS AND A MODIFIED AUTOMOBILE DRIVEABILITY PROCEDURE.

by TERRY L. ULLMAN; CHARLES T. HARE
SOUTHWEST RES. INST., P.O. DRAWER 28510, SAN
ANTONIO, TEX. 78284
EPA-68-03-2391
Rept. No. EPA-460/3-77-020; PB-276 922; 1977; 442P 14REFS
REPT. FOR APR-NOV 1977.
Availability: NTIS

HS-023 008

MANPOWER ANALYSIS IN TRANSPORTATION SAFETY. FINAL REPORT

A MANPOWER REVIEW IS PROVIDED OF NATIONAL, STATE, AND LOCAL NEEDS FOR SAFETY SKILLS. IT PROJECTS FUTURE MANNING LEVELS FOR TRANSPORTATION SAFETY PERSONNEL IN BOTH THE PUBLIC AND PRIVATE SECTORS. SURVEY INFORMATION REVEALED THAT THERE ARE CURRENTLY APPROXIMATELY 121,000 PERSONS EMPLOYED DIRECTLY IN TRANSPORTATION SAFETY OCCUPATIONS WITHIN THE AIR CARRIER, HIGHWAY AND TRAFFIC SAFETY, MOTOR CARRIER, PIPELINE, RAIL CARRIER, AND MARINE CARRIER TRANSPORTATION INDUSTRY GROUPS. THE PROJECTED NEED FOR 1980 IS OVER 145,000 OF WHICH OVER 80% WILL BE IN HIGHWAY SAFETY. AN ANALYSIS OF TRANSPORTATION TASKS IS INCLUDED AND SHOWS NINE

GENERAL CATEGORIES ABOUT WHICH THE MAJORITY OF SAFETY ACTIVITIES ARE FOCUSED. THESE CATEGORIES INCLUDE SAFETY ADMINISTRATION, TRAINING, AND ENGINEERING; OPERATIONAL SAFETY PROGRAM PLANNING; SAFETY ANALYSIS; ACCIDENT INVESTIGATION; SAFETY SECURITY, INSPECTION AND COMPLIANCE; AND EMERGENCY SAFETY SERVICES. A SKILLS ANALYSIS SHOWS A GENERALLY HIGH LEVEL OF EDUCATIONAL BACKGROUND AND SEVERAL YEARS OF EXPERIENCE ARE REQUIRED FOR MOST TRANSPORTATION SAFETY JOBS. AN OVERALL REVIEW OF SAFETY PROGRAMS IN THE TRANSPORTATION INDUSTRY IS INCLUDED, TOGETHER WITH CHAPTERS ON THE INDIVIDUAL TRANSPORTATION MODES.

by C. S. BAUER; H. M. BOWDEN; C. A. COLFORD; P. J. DEFILIPPS; J. D. DENNIS; A. K. EHLERT; H. A. POPKIN; G. F. SCHRADER; Q. N. SMITH
FLORIDA TECHNOLOGICAL UNIV.,
TRANSPORTATION SYSTEMS INST., ORLANDO, FLA.
32816
DOT-OS-40020
Rept. No. DOT-TST-77-40; PB-275 445; 1977; 383P 41REFS
REPT. FOR 30 OCT 1973-30 JUN 1976.
Availability: NTIS

HS-023 009

1975 NATIONAL TRUCK CHARACTERISTIC REPORT

THE INFORMATION PROVIDED IS BASED ON DATA COLLECTED DURING THE TRUCK WEIGHT STUDIES BY STATE HIGHWAY AGENCIES. THE DATA WERE COLLECTED DURING THE SUMMER OF 1975 AT 690 ROADSIDE LOCATIONS. A SAMPLE OF TRUCKS WAS WEIGHED AND INFORMATION RECORDED ON VEHICLE TYPE, BODY TYPE, CLASS OF OPERATION, COMMODITY CARRIED, LOAD STATUS, FUEL TYPE, TOTAL GROSS WEIGHT, TOTAL WHEEL BASE, AND INDIVIDUAL AXLE WEIGHTS AND SPACINGS. THE FOLLOWING DATA ARE PRESENTED IN FIGURES: DISTRIBUTION OF 1975 TRUCK WEIGHT STUDY SAMPLE BY VEHICLE TYPE; DISTRIBUTION OF ALL TRUCKS COUNTED BY VEHICLE TYPE AND WEIGHED BY VEHICLE TYPE; AND TRUCK TYPES AS A PERCENT OF ALL VEHICLES COUNTED IN 1969-1975 AND AS A PERCENT OF ALL TRUCKS COUNTED IN THAT PERIOD OF TIME. TABULATED DATA INCLUDE THE DISTRIBUTION OF STATIONS OPERATED AND VEHICLES COUNTED AND WEIGHED BY HIGHWAY SYSTEM DURING THE 1975 STUDY AND THE DISTRIBUTION OF TRUCKS COUNTED AND TRUCKS WEIGHED BY VEHICLE TYPE. NATIONAL SUMMARIES OF TRUCK WEIGHT CHARACTERISTICS INCLUDE THE FOLLOWING: FOR 1969-1975, AVERAGE WEIGHT OF LOADED TRUCKS, AVERAGE WEIGHT OF EMPTY TRUCKS, AND AVERAGE CARRIED LOAD; FREQUENCY OF HEAVY AXLE AND HEAVY GROSS WEIGHTS PER THOUSAND VEHICLES WEIGHED IN 1975; PERCENT CARRYING LOAD BY TRUCK TYPE, BODY, TYPE, AND CLASS OF OPERATION IN 1975; AND AVERAGE CARRIED LOAD BY TRUCK TYPE, BODY TYPE, AND CLASS OF OPERATION IN 1975. ALSO INCLUDED IN THE NATIONAL SUMMARIES ARE THE WEIGHT DISTRIBUTION SUMMARY BY VEHICLE TYPE AND LOAD STATUS FOR 1975; GROSS

WEIGHTS BY VEHICLE TYPE, BODY, TYPE, AND LOAD STATUS, AND PERCENT OF GASOLINE AND DIESEL ENGINES BY TRUCK TYPE AND CLASS OF OPERATION. REGIONAL AND STATE SUMMARIES OF TRUCK WEIGHT CHARACTERISTICS INCLUDE AVERAGE WEIGHT OF BOTH EMPTY AND LOADED TRUCKS IN 1971-1975 AND A SUMMARY OF 18-KIP RATES AND EQUIVALENTS FOR RIGID PAVEMENT DESIGN.

by P. KENT; M. BRANES
FEDERAL HWY. ADMINISTRATION, HWY. STATISTICS
DIV., WASHINGTON, D.C. 20590
1978; 67P
Availability: GPO

HS-023 010

THE TIRE SERVICE SPECIALIST. WHEEL ALIGNMENT, PT. 2. ALIGNMENT ANGLES AND THEIR FUNCTION

FOUR ADJUSTABLE ALIGNMENT ANGLES ARE DESCRIBED: CAMBER, CASTER, TOE, AND CENTER STEERING. THE EFFECTS OF MISALIGNMENT ON TIRE WEAR ARE ILLUSTRATED AND METHODS OF CORRECTING ALIGNMENT ARE OUTLINED AND ILLUSTRATED. WHEREAS CAMBER IS A WEAR ANGLE, CASTER IS A STABILITY ANGLE. TOE IS THE MOST IMPORTANT ADJUSTMENT ANGLE IN TERMS OF TIRE WEAR. CENTER STEERING IS RELATED TO TOE AND IS USUALLY ADJUSTED AS TOE IS ADJUSTED. THE ADJUSTMENT OF ANY ANGLE WILL USUALLY HAVE SOME EFFECT ON THE OTHER ADJUSTABLE ANGLES.

Publ: DEALER NEWS V41 N7 P31-5 (10-24 APR 1978)
1978
Availability: SEE PUBLICATION

HS-023 011

A SYSTEMS ENGINEERING STUDY OF NIGHT VISIBILITY WITH AUTOMOBILE HEADLIGHTING

A METHODOLOGY HAS BEEN DEVELOPED TO ISOLATE ALL THE INDEPENDENT VARIABLES AFFECTING NIGHT DRIVING VISIBILITY SUCH AS SOURCES, REFLECTIVE SURFACES, TRANSMISSION MEDIA, AND OBSERVER. CORRELATION WAS ACHIEVED BETWEEN THE RESULTS OBTAINED FROM FIELD EXPERIMENTS FOR THE UNOPPOSED ROADWAY OBSTACLE DETECTION TASK AND CORRESPONDING CALCULATIONS BASED ON ACCURATE FIELD ILLUMINATION ENGINEERING DATA AND OBSERVER LABORATORY VISUAL PERFORMANCE DATA. USING THE LUMINANCE DIFFERENCE METHOD DEVELOPED DURING THE VISUAL PERFORMANCE STUDIES, IT IS DEMONSTRATED HOW THE ILLUMINANCE CHARACTERISTICS OF THE SOURCE INTERACTING WITH THE SCENE LUMINANCE FACTORS CAN AFFECT THE LUMINANCE DIFFERENCE SIGNAL AVAILABLE FOR DETECTION WITH RESPECT TO THE LUMINANCE DIFFERENCE SIGNAL REQUIRED BY THE OBSERVER. EXAMPLES OF THE APPLICATION OF THIS TYPE OF APPROACH ARE ALSO GIVEN TO ANALYZE THE UNOPPOSED CASE AND THE INTERACTION WITH OTHER

SOURCES OF ILLUMINANCE SUCH AS MOONLIGHT, DUSK SKYLIGHT, AND OPPOSING HEADLIGHTS. THESE EXAMPLES ALSO SHOW THE SENSITIVITY OF VISIBILITY TO THE FIELD, SOURCE, AND TASK PARAMETERS. EXTENSION OF THE METHODOLOGY TO STATISTICAL POPULATION PERFORMANCE EVALUATIONS IS OUTLINED, AS IS CURRENT RESEARCH IN PROGRESS FOR OBTAINING A STATISTICAL MEASURE OF THE PARAMETERS AFFECTING HEADLAMP POPULATION.

by H. F. L. PINKNEY; A. A. AYAD; P. HUCULAK; ANN L. HARRISON
NATIONAL RES. COUNCIL CANADA, OTTAWA, CANADA
Rept. No. NRC-16322; NAE-MS-140; 1977; 70P 44REFS
EXPANDED VERSION OF REPORT PRESENTED AT INTERNATIONAL AUTOMOTIVE ENGINEERING CONGRESS AND EXPOSITION, DETROIT, 28 FEB-4 MAR 1977. SUMMARY ALSO IN FRENCH.
Availability: CORPORATE AUTHOR

HS-023 012

AN ASSESSMENT OF THE EFFECT OF THE INTRODUCTION OF ANTI-THEFT LOCKS FOR CARS [AUSTRALIA]

THE EFFECTIVENESS OF ANTITHEFT STEERING LOCKS, REQUIRED AFTER 1 JAN 1972, WAS STUDIED FROM DATA COLLECTED BY THE AUSTRALIAN BUREAU OF STATISTICS, THE POLICE DEPARTMENTS OF NEW SOUTH WALES AND VICTORIA, AUSTRALIA, AND THE DEPT. OF MOTOR TRANSPORT IN NEW SOUTH WALES. IT IS ESTIMATED THAT INSTALLATION OF ANTITHEFT LOCKS HAS REDUCED NEW CAR THEFTS AND CASUALTY ACCIDENTS INVOLVING STOLEN CARS BY 67%. MORE SOPHISTICATED ANTITHEFT DEVICES SHOULD BE DEVELOPED TO OVERCOME INCREASING KNOWLEDGE BY CAR THIEVES AS TO THE METHODS OF NEUTRALIZING PRESENT LOCKS. THE ECONOMIC BENEFITS FROM ACCIDENT REDUCTION ARE JUST ABOVE THE COSTS OF ANTITHEFT LOCK INSTALLATION AND THE ECONOMIC BENEFITS FROM PREVENTION OF CAR DAMAGE ARE TWICE AS HIGH AS COSTS. THE COMBINED BENEFIT/COST RATIO IS 3.15/1. MOTOR VEHICLE THEFTS IN AUSTRALIA REACHED A HIGH OF 45,900 IN 1972, OR 0.9% OF REGISTERED MOTOR VEHICLES. THEFT PROBABILITIES ARE HIGHER IN SYDNEY AND MELBOURNE THAN IN THE RURAL AREAS OF NEW SOUTH WALES AND VICTORIA. BETWEEN 1970 AND 1973, 1964 MODEL CARS HAD THE HIGHEST THEFT PROBABILITY. THEFT PROBABILITIES OF ONE-YEAR-OLD CARS DROPPED FROM 40% AND 61% IN 1970 AND 1971 TO 15% AND 18% IN 1972 AND 1973, RESPECTIVELY. AT LEAST 25% OF STOLEN CARS WERE LEFT UNLOCKED. NEWSPAPER PUBLICITY GIVEN TO STOLEN MOTOR VEHICLE REGISTRATION NUMBERS IN VICTORIA MAY HAVE INFLUENCED THE FINDINGS REPORTED HERE, BUT THE EFFECT CANNOT BE QUANTIFIED.

WILBUR SMITH AND ASSOCIATES, PTY. LTD.,
HOLLAND HOUSE, 492 ST. KILDA RD., MELBOURNE,
VIC. 3004, AUSTRALIA
1975; 61P REFS
Availability: DEPARTMENT OF TRANSPORT, G.P.O. BOX
1839 Q, MELBOURNE, VIC. 3001, AUSTRALIA

HS-023 013

DRIVERS LICENSE GUIDE, 1978

ALL VALID DRIVERS LICENSE FORMATS FOR EACH OF THE UNITED STATES, PUERTO RICO, AND THE CANADIAN PROVINCES ARE ILLUSTRATED. MOTOR-CYCLE OPERATOR REQUIREMENTS ARE OUTLINED FOR THE U.S. AND CANADA, AND MILITARY EXTENSION POLICIES ARE DESCRIBED FOR EACH U.S. JURISDICTION. PROCEDURES ARE SUGGESTED FOR DETECTION OF ALTERED AND FRAUDULENT LICENSES. IDENTIFICATION CARD POLICIES OF U.S. MOTOR VEHICLE DEPARTMENTS ARE OUTLINED, AND THE REMINGTON RAND SOUNDEX SYSTEM FOR ASSIGNING LICENSE NUMBERS IS EXPLAINED. MAJOR CREDIT CARDS ARE ILLUSTRATED, AS ARE CURRENT AUTOMOBILE REGISTRATION PLATES FOR THE UNITED STATES AND CANADA. A TABLE IS PROVIDED OF THE SOCIAL SECURITY NUMBERS ISSUED BY THE STATES.

DRIVERS LICENSE GUIDE CO., 1492 ODDSTAD DR.,
REDWOOD CITY, CALIF. 94063
1978; 98P
Availability: CORPORATE AUTHOR

HS-023 014

FLEET ACCIDENT RATES, 1976 EDITION, AND FINAL BULLETIN FOR THE 1975 NATIONAL FLEET SAFETY CONTEST, WITH AWARD WINNERS

THE INDIVIDUAL AND SUMMARIZED EXPERIENCE OF MOTOR TRANSPORTATION VEHICLE FLEETS PARTICIPATING IN THE NATIONAL FLEET SAFETY CONTEST ARE TABULATED FOR THE PERIOD 1 JAN-31 DEC 1975. DURING THE CONTEST YEAR, 2664 FLEETS OPERATING 345,376 VEHICLES TRAVELLED OVER 6.2 BILLION MILES AND EXPERIENCED 69,443 ACCIDENTS. THE AVERAGE ACCIDENT RATES SHOWN SHOULD BE USED AS INDICATIVE RATHER THAN EXACT. ACCIDENT FREQUENCY RATES FOR THE CURRENT YEAR AND FOR THE TWO PREVIOUS YEARS ARE SUMMARIZED. THE RATES SHOW THE EXPERIENCE OF ALL FLEETS PARTICIPATING DURING THE INDICATED PERIOD. THE COMPOSITION OF THE GROUPING CHANGES FROM YEAR TO YEAR. ALL ACCIDENTS WERE REPORTED IN WHICH THE VEHICLE WAS INVOLVED (UNLESS PROPERLY PARKED) WHEN THAT ACCIDENT RESULTED IN DEATH, PERSONAL INJURY, OR PROPERTY DAMAGE. THE ACCIDENT RATE IS EXPRESSED IN NUMBER OF ACCIDENTS PER ONE MILLION MILES TRAVELLED.

NATIONAL SAFETY COUNCIL, 425 N. MICHIGAN AVE.,
CHICAGO, ILL. 60611
1976; 52P
Availability: CORPORATE AUTHOR, STOCK NO. 229.23
\$1.68

HS-023 015

CHILDSAFE: WHEN CHILDREN TRAVEL BY CAR

AUTO ACCIDENTS ARE THE LEADING CAUSE OF DEATH AMONG CHILDREN. CRASH-TESTED SAFETY RESTRAINTS COULD PREVENT MOST OF THESE

DEATHS AND INJURIES. PROJECT CHILDSAFE, A SAFETY/HEALTH EDUCATION PROGRAM SPONSORED BY THE WISCONSIN HOSPITAL ASSOC. AND THE WISCONSIN DEPT. OF PUBLIC INSTRUCTION, ALERTS NEW PARENTS TO THE HAZARDS TO CHILDREN RIDING UNRESTRAINED IN A MOTOR VEHICLE, AND PROVIDES INFORMATION ON PROPER SAFETY DEVICES AND OTHER TRAVELLING AIDS. AMONG THE HAZARDS ARE DISTRACTION OR DIVERSION OF THE DRIVER, THE MISSILE EFFECT OF THE CHILD'S BODY IN A CRASH OR SUDDEN STOP, AND IMPROPER "SAFETY" EQUIPMENT DUE TO POOR DESIGN OR CONSTRUCTION. ADULT SEAT BELTS ARE NOT SUITABLE FOR CHILDREN. SEVENTEEN CRASH-TESTED CHILD RESTRAINTS ARE CURRENTLY AVAILABLE. STATISTICS COLLECTED IN 1975 BY THE INSURANCE INST. FOR HWY. SAFETY INDICATE THAT ONLY 7% OF CHILDREN UNDER AGE 10 WERE PROPERLY RESTRAINED AGAINST POSSIBLE CRASH INJURY. UNRESTRAINED CHILDREN IN THE FRONT SEAT HAVE THE HIGHEST INJURY RATE. THE CHILD-SAFE PROJECT INCLUDES A TEN-MINUTE SLIDE PROGRAM, A BROCHURE, A POSTER, AND A BUMPER STICKER. PUBLIC SERVICE RADIO SPOTS WERE DISTRIBUTED TO ALL MAJOR RADIO STATIONS IN WISCONSIN. GRANTS WERE PROVIDED FOR DEVELOPMENT OF THESE MATERIALS AND FOR A TRAVELLING DISPLAY. THE MATERIALS WERE DEVELOPED FROM INFORMATION PROVIDED BY PHYSICIANS FOR AUTO SAFETY AND ACTION FOR CHILD TRANSPORTATION SAFETY, BOTH OF NEW JERSEY. OTHER ACTIVITIES IN CONNECTION WITH THE PROJECT INCLUDE ORGANIZING SPEAKERS' BUREAUS, SETTING UP EXHIBITS, ARRANGING FOR FEATURE ARTICLES IN NEWSPAPERS, ENCOURAGING THE ADDITION OF CHILD RESTRAINT INFORMATION TO HIGH SCHOOL DRIVER EDUCATION, PROMOTING AVAILABILITY OF CRASH-TESTED RESTRAINTS IN LOCAL STORES, ESTABLISHING A BANK OF USED RESTRAINTS FOR NEEDY PARENTS, AND SELLING APPROVED RESTRAINTS IN HOSPITAL GIFT SHOPS. VARIOUS TYPES OF CHILD RESTRAINTS ARE DESCRIBED AND TIPS ARE PRESENTED FOR SAFE TRAVELLING WITH CHILDREN.

by C. ERNEST COONEY; SUSAN KUMMEROW
 Publ: CHILDREN TODAY V6 N4 P11-5 (JUL-AUG 1977)
 1977
 Availability: SEE PUBLICATION

HS-023 016

CHILTON'S MORE MILES-PER-DOLLAR GUIDE

INFORMATION IS PROVIDED ON BUYING, DRIVING, MAINTAINING, AND PLANNING FOR ECONOMICAL AUTOMOBILE TRANSPORTATION, AS WELL AS ON BUYING GASOLINE, OIL, TIRES, AND ACCESSORIES THAT WILL GIVE THE BEST RESULTS IN FUEL ECONOMY. A CHAPTER IS DEVOTED TO 125 WAYS TO IMPROVE GAS MILEAGE. THE BASICS OF ENGINE OPERATION ARE EXPLAINED, WITH DESCRIPTIONS OF THE MAJOR AUTOMOBILE SYSTEMS AND INDICATIONS OF MALFUNCTION THAT MAY BE SPOTTED BEFORE MAJOR REPAIRS ARE NEEDED. THE OFFI-

CIAL 1977 ENVIRONMENTAL PROTECTION AGENCY GAS MILEAGE RATINGS ARE TABULATED.

by RONALD M. WEIERS
 CHILTON BOOK CO., RADNOR, PA.
 1977; 252P 27REFS
 Availability: CORPORATE AUTHOR \$5.95

HS-023 017

THE RELATIONSHIP BETWEEN ENGINE OIL VISCOSITY AND ENGINE PERFORMANCE. PT. 3

ASPECTS UNDER DISCUSSION OF THE RELATIONSHIP BETWEEN ENGINE OIL VISCOSITY AND ENGINE PERFORMANCE INCLUDE ENGINE PUMPABILITY AND CRANKABILITY TESTS, THE VISCOSITY OF POLYMER CONTAINING ENGINE OILS, ENERGY SAVINGS WITH MULTIGRADED DIESEL LUBRICANTS, AND POLYMER STABILITY IN ENGINES. OTHER TOPICS INCLUDE TIME/TEMPERATURE ADDITIVE RELEASE PACKAGE USE IN LUBRICANTS, TEMPORARY VISCOSITY LOSS, OIL VISCOSITY AT HIGH SHEAR RATES, AND FRICTION POWER LOSS OF MINERAL AND SYNTHETIC LUBRICANTS IN A RUNNING ENGINE. THE SECOND PART OF A DISCUSSION OF EUROPEAN ACTIVITY IN CLASSIFICATION OF ENGINE OIL VISCOSITY IS PROVIDED.

SOCIETY OF AUTOMOTIVE ENGINEERS, INC., 400 COMMONWEALTH DR., WARRENDALE, PA. 15096; AMERICAN SOCIETY OF TESTING AND MATERIALS Rept. No. SAE-SP-429; ASTM-STP-621-S2; 1978; 108P REFS SYMPOSIUM PRESENTED AT 1978 SAE CONGRESS AND EXPOSITION, DETROIT, 27 FEB-3 MAR 1978. INCLUDES HS-023 018--HS-023 026.
 Availability: SAE

HS-023 018

ENGINE PUMPABILITY AND CRANKABILITY TESTS ON COMMERCIAL "W" GRADED ENGINE OILS COMPARED TO BENCH TEST RESULTS

THE CORRELATIONS OBTAINED BETWEEN COLD CRANKING SIMULATOR (CCS) VISCOSITIES AND GASOLINE AND DIESEL ENGINE CRANKING DATA ON 17 COMMERCIAL ENGINE OILS ARE SUMMARIZED, INCLUDING THE NEW SYNTHETIC 5W/20 OILS. THE ABILITY OF AN OIL PUMPABILITY BENCH TEST TO PREDICT THE PUMPABILITY PROPERTIES OF THESE 17 OILS IN A GASOLINE ENGINE IS ALSO PRESENTED. THE COLD CRANKING SIMULATOR VISCOSITIES MEASURED AT TEMPERATURES FROM -40° F (-40° C) TO 32° F (0° C) WERE STUDIED TO DETERMINE THE NECESSITY OF MEASURING CCS VISCOSITIES OF EACH "W" GRADED OIL AT ITS MINIMUM EXPECTED USE TEMPERATURE. THE VACUUM PIPETTE RIG SATISFACTORILY PREDICTED THE BORDERLINE PUMPING TEMPERATURES OF 17 ENGINE OILS IN A 350 CID (5.7 LITER) V-8 GASOLINE ENGINE. ALL 17 OILS EVALUATED EXHIBITED BORDERLINE PUMPING TEMPERATURES SUBSTANTIALLY BELOW

October 31, 1978

HS-023 021

**THE MANUFACTURERS' MEDIAN EXPECTED
MINIMUM STARTING TEMPERATURES.**

by ROSS M. STEWART
GULF RES. AND DEVEL. CO.
Publ: HS-023 017 (SAE-SP-429), "THE RELATIONSHIP
BETWEEN ENGINE OIL VISCOSITY AND ENGINE
PERFORMANCE. PT. 3," WARRENDAL, PA., 1978 P1-14
Rept. No. SAE-780369; 1978; 13REFS
PRESENTED AT 1978 SAE CONGRESS AND
EXPOSITION, DETROIT, 27 FEB-3 MAR 1978.
Availability: IN HS-023 017

HS-023 019

**INFLUENCE OF THE VISCOSITY OF POLYMER
CONTAINING ENGINE OILS ON THE
STARTABILITY OF ENGINES**

INVESTIGATIONS USING FOUR MONOGRADE AND THREE MULTIGRADE ENGINE OILS WERE PERFORMED BY COLD CRANKING AN AUTOMOTIVE ENGINE TO DETERMINE WHETHER OR NOT THERE IS FRICTION REDUCTION DUE TO THE PSEUDOPLASTIC BEHAVIOR OF THE MULTIGRADE ENGINE OILS. A COMPARISON OF THE OILS USING VISCOMETERS INDICATED THE VISCOMETERS' ABILITY TO PREDICT THE "ENGINE VISCOSITIES" OVER A TEMPERATURE AND SHEAR RATE RANGE. DECREASING FRICTIONAL LOSSES CAN BE EXPECTED DUE TO PSEUDOPLASTIC BEHAVIOR WHEN STARTING AN ENGINE AT LOW TEMPERATURES. THE COLD CRANKING SIMULATOR (CCS) GIVES INCORRECT VALUES WITH LUBRICATING OILS WHICH SHOW HIGH REVERSIBLE VISCOSITY LOSSES UNDER SHEAR CONDITIONS. THE ROTOVISCO SHOWS GOOD CORRELATION WITH TEST RESULTS, BUT IS MORE DIFFICULT TO USE THAN THE CCS, DUE TO THE NECESSITY OF PLOTTING FLOW CURVES. RESULTS OF STUDIES PREVIOUSLY UNDERTAKEN USING A PRESSURIZED CAPILLARY VISCOMETER WERE CONFIRMED. WHEN STARTING AN AUTOMOTIVE ENGINE AT LOW TEMPERATURES, HYDRODYNAMIC FRICTION IS ENCOUNTERED IN THE FIRST SECONDS AFTER CRANKING HAS BEGUN. AT HIGHER TEMPERATURES, INCREASING SOLID-BODY FRICTION IS ENCOUNTERED. COLD STARTING IS NOT THEREFORE AS DANGEROUS AS IS NORMALLY EXPECTED FOR MIXED FRICTION, BUT IS RATHER LIKE STARTING AT HIGH LUBRICATING OIL TEMPERATURES.

by CURT VON PETERY; HORST KRUSE; WILFRIED J. BARTZ
GUTEHOFFNUNGSHUTTE STERKRADE AG,
MASCHINENBAU ESSLINGEN, ESSLINGEN,
GERMANY; HANNOVER TECHNICAL UNIV.,
HANNOVER, GERMANY; TECHNISCHE AKADEMIE
ESSLINGEN, OSTFILDERN, GERMANY
Publ: HS-023 017 (SAE-SP-429), "THE RELATIONSHIP
BETWEEN ENGINE OIL VISCOSITY AND ENGINE
PERFORMANCE. PT. 3," WARRENDAL, PA., 1978 P15-23
Rept. No. SAE-780370; 1978; 8REFS
PRESENTED AT 1978 SAE CONGRESS AND
EXPOSITION, DETROIT, 27 FEB-3 MAR 1978.
SPONSORED BY GERMAN RES. COMMUNITY.
Availability: IN HS-023 017

HS-023 020

**ENERGY SAVINGS WITH MULTIGRADED DIESEL
LUBRICANTS - AN EXPERIMENTAL TEST DESIGN
IN WINTER, URBAN BUS OPERATION**

THE USE OF EXPERIMENTAL DESIGN TECHNIQUES IS ILLUSTRATED FOR OBTAINING AN ACCURATE ASSESSMENT OF MULTIGRADE HEAVY DUTY (HD) PERFORMANCE IN THE FIELD. COMPARED TO MONOGRADE (SAE 40) OIL, THE USE OF SAE 15W/40 OIL WAS FOUND TO IMPROVE VEHICLE FUEL MILEAGE AS WELL AS OIL ECONOMY. THE DEMONSTRATION IN LONDON, ONT., CANADA, CONDUCTED WITH TWO GROUPS OF 10 DIESEL POWERED CITY BUSES IN REGULAR SERVICE, WAS STRUCTURED TO DAMPEN OUT THE EFFECT OF SUCH INCIDENTAL VARIABLES AS AMBIENT TEMPERATURE, VEHICLE DIFFERENCES, PREVIOUS MILEAGE, AND CROSS CONTAMINATION OF OILS. STATISTICAL DATA ANALYSIS INDICATES A "MOST PROBABLE" IMPROVEMENT IN FUEL MILEAGE OF 2.7% AND A 47% INCREASE IN MULTIGRADED OIL ECONOMY.

by G. R. FARNSWORTH; H. E. BACHMAN; R. OVERTON
EXXON CHEMICAL CO., PARAMINS TECHNOLOGY
DIV.; IMPERIAL OIL ENTERPRISES, LTD., RES. DEPT.
Publ: HS-023 017 (SAE-SP-429), "THE RELATIONSHIP
BETWEEN ENGINE OIL VISCOSITY AND ENGINE
PERFORMANCE. PT. 3," WARRENDAL, PA., 1978 P25-35
Rept. No. SAE-780371; 1978; 15REFS
PRESENTED AT 1978 SAE CONGRESS AND
EXPOSITION, DETROIT, 27 FEB-3 MAR 1978.
Availability: IN HS-023 017

HS-023 021

POLYMER STABILITY IN ENGINES

THE MECHANICAL AND THERMO-OXIDATIVE DEGRADATION PROCESSES OF POLYMERIC MINERAL OIL ADDITIVES UNDER ENGINE CONDITIONS CAN BE MEASURED WITH GREAT ACCURACY BY GEL PERMEATION CHROMATOGRAPHY (GPC), EVEN FOR USED OILS. THIS PROCESS MEASURES THE MOLECULAR WEIGHT DISTRIBUTION OF THE POLYMER AS AN INDICATOR OF ITS STABILITY AGAINST DEGRADATION. RESULTS OF SUCH MEASUREMENTS ARE GIVEN FOR VARIOUS TYPES OF VI IMPROVERS (POLYALKYL METHACRYLATES, ETHYLENE-PROPYLENE COPOLYMERS, AND HYDROGENATED STYRENE-DIENE BLOCK COPOLYMERS) AFTER EXPOSURE TO DIESEL AND OTTO ENGINES. THE INFLUENCE OF MECHANICAL AND THERMO-OXIDATIVE DEGRADATION IS DISCUSSED BY MEANS OF MODEL CALCULATIONS. COMPARATIVE VISCOSITY DATA CONFIRM THE DATA OBTAINED FROM THE DISTRIBUTION MEASUREMENTS. POLYALKYL METHACRYLATES SHOW THE HIGHEST STABILITY. OILS WITH HYDROGENATED STYRENE-DIENE BLOCK

COPOLYMERS SHOW AN UNSATISFACTORY RESISTANCE TO THERMO-OXIDATIVE DEGRADATION.

by W. WUNDERLICH; H. JOST

ROHM GMBH

Publ: HS-023 017 (SAE-SP-429), "THE RELATIONSHIP BETWEEN ENGINE OIL VISCOSITY AND ENGINE PERFORMANCE. PT. 3," WARRENDALE, PA., 1978 P37-44 Rept. No. SAE-780372; 1978; 5REFS PRESENTED AT 1978 SAE CONGRESS AND EXPOSITION, DETROIT, 27 FEB-3 MAR 1978. Availability: IN HS-023 017

HS-023 022

THE USE OF TIME/TEMPERATURE ADDITIVE RELEASE PACKAGE IN THE AUTOMOTIVE LUBRICATION SYSTEM

A SYSTEM COMBINING AN OIL FILTER WITH A SUPPLEMENTARY TIME/TEMPERATURE ADDITIVE RELEASE PACKAGE HAS BEEN DEVELOPED WHICH PROVIDES A NONCONVENTIONAL BUT VERY EFFECTIVE MEANS OF MAINTAINING THE VISCOSITY LEVEL IN THE OPERATING ENGINE. THE SYSTEM SIMULTANEOUSLY INTRODUCES CERTAIN OTHER ADDITIVES IMPORTANT TO THE ENGINE OIL PERFORMANCE. THESE ADDITIVES INCLUDE A HIGH MOLECULAR WEIGHT POLYMER BINDER, AN ASHLESS ANTI-OXIDANT, AND A MULTIFUNCTIONAL ANTIWEAR, ANTI-OXIDANT, AND BEARING CORROSION INHIBITOR CONTAINING NO PHOSPHORUS. STUDIES OF THE STAR (SUPPLEMENTARY TIME/TEMPERATURE ADDITIVE RELEASE) SYSTEM HAVE BEEN CONDUCTED TO BETTER UNDERSTAND THE ADDITIVE DELIVERY RATE AS A FUNCTION OF OPERATING CONDITIONS IN THE ENGINE. THE DATA SHOW THAT THE SYSTEM IS GENERALLY BENEFICIAL AND EFFECTIVE IN ACTUAL FIELD PERFORMANCE AS WELL AS IN STATIONARY ENGINE TEST SEQUENCES. THE USE OF THE STAR SYSTEM RESULTS IN HIGHER OIL VISCOSITIES, LOWER OXIDATION IN FIELD AND BENCH TESTS, A TWO-THIRDS REDUCTION IN COPPER-LEAD BEARING CORROSION, AND A LOWER VISCOSITY INCREASE AT LOW TEMPERATURES.

by MICHAEL R. BETHELL; PAUL S. BROWNE; ROBERT W. HEGEL

MONROE AUTO EQUIPMENT CO.

Publ: HS-023 017 (SAE-SP-429), "THE RELATIONSHIP BETWEEN ENGINE OIL VISCOSITY AND ENGINE PERFORMANCE. PT. 3," WARRENDALE, PA., 1978 P45-61 Rept. No. SAE-780373; 1978; 18REFS PRESENTED AT 1978 SAE CONGRESS AND EXPOSITION, DETROIT, 27 FEB-3 MAR 1978. Availability: IN HS-023 017

HS-023 023

TEMPORARY VISCOSITY LOSS AND ITS RELATIONSHIP TO JOURNAL BEARING PERFORMANCE

TO DETERMINE THE CORRELATION BETWEEN JOURNAL BEARING PERFORMANCE AND VISCOSITY LOSS IN A CAPILLARY, VISCOSITIES OF 11 BASE OIL-POLYMER BLENDS WERE MEASURED IN A HIGH-

SHEAR CAPILLARY VISCOMETER (HSCV) AT SHEAR RATES FROM 100 TO NEARLY 1,000,000 S⁻¹. ALTHOUGH LOW-SHEAR KINEMATIC VISCOSITIES DO NOT PREDICT BEARING PERFORMANCE DIFFERENCES FOUND BY ROSENBERG WITH THE SAME OIL BLENDS, HSCV VISCOSITIES AT SHEAR RATES NEAR 500,000 S⁻¹ CORRELATE WELL WITH THE BEARING PERFORMANCE DATA. DIFFERENCES AMONG POLYMERS ARE STRONGLY RELATED TO MOLECULAR WEIGHT. ALL ENGINE OILS CONTAINING POLYMERS EXPERIENCE A LOSS IN VISCOSITY AT SHEAR RATES CORRESPONDING TO THOSE EXISTING IN ENGINE BEARINGS. TEMPORARY VISCOSITY LOSS IS A STRONG FUNCTION OF POLYMER MOLECULAR WEIGHT. MINIMUM FILM THICKNESSES IN BEARINGS CANNOT BE ACCURATELY PREDICTED FOR ALL POLYMERS FROM VISCOSITY DATA AT SHEAR RATES NEAR 5 TIMES 10(05)S⁻¹, PROBABLY BECAUSE SHEAR RATES IN THE MINIMUM THICKNESS FILM REGION ARE MUCH HIGHER.

by MICHAEL L. MCMILLAN; CHESTER K. MURPHY
GENERAL MOTORS RES. LABS., FUELS AND LUBRICANTS DEPT.

Publ: HS-023 017 (SAE-SP-429), "THE RELATIONSHIP BETWEEN ENGINE OIL VISCOSITY AND ENGINE PERFORMANCE. PT. 3," WARRENDALE, PA., 1978 P63-77 Rept. No. SAE-780374; 1978; 29REFS PRESENTED AT 1978 SAE CONGRESS AND EXPOSITION, DETROIT, 27 FEB-3 MAR 1978. Availability: IN HS-023 017

HS-023 024

OIL VISCOSITY AT HIGH SHEAR RATES MEASURED BY A FLOATING JOURNAL BEARING

A HIGH SHEAR RATE, 1X10(06)SEC⁻¹, VISCOMETER USES A COMMERCIAL TOOL POST GRINDER FITTED WITH A THREE-BEARING INTERNAL TYPE SPINDLE TO DRIVE A ONE INCH (2.54 CM) DIAMETER JOURNAL AT 10,400 RPM. A 0.0005 INCH (0.00127 CM) THICK FLUID FILM BETWEEN THE JOURNAL AND A FLOATING BEARING TRANSFERS A TORQUE TO THE BEARING. AN OIL PUMP BUILT INTO THE JOURNAL MINIMIZES TEMPERATURE AND OIL FLOW PROBLEMS. TORQUES MEASURED WITH NEWTONIAN OILS PROVIDE A TORQUE-VISCOSITY CALIBRATION THAT IS USED TO CONVERT TORQUES OF NON-NEWTONIAN OILS TO VISCOSITIES. TWO BEARINGS ARE USED; ONE MEASURES VISCOSITIES FROM 1.6 TO 5 CP, THE OTHER, 3.4 TO 10 CP. LESS THAN ONE HOUR IS REQUIRED TO MEASURE AN OIL'S VISCOSITY OVER THE RANGE OF EITHER BEARING AT TEMPERATURES UP TO 370° F (188° C). THIS APPARATUS MEASURES VISCOSITIES AT THE SHEAR RATE AND TEMPERATURES OF CRITICAL HIGH SHEAR SECTIONS OF OPERATING ENGINES AND HYDRAULIC SYSTEMS. THE DIFFERENCES BETWEEN ASTM D 445 KINEMATIC VISCOSITIES AND VISCOSITIES AT 1X10(06)SEC⁻¹ SHEAR RATE WERE DETERMINED FOR MULTIGRADED OILS FORMULATED WITH A NUMBER OF POLYMERIC VISCOSITY INDEX IMPROVERS. AT THE HIGH SHEAR RATE THE PERCENT LOSS OF THE KINEMATIC VISCOSITY CONTRIBUTED BY THE

October 31, 1978

HS-023 026

POLYMERS INCREASES AS TEMPERATURE DECREASES.

by M. J. DENHERDER; J. W. HARNACH; D. W. WESTER
AMOCO OIL CO.
Publ: HS-023 017 (SAE-SP-429), "THE RELATIONSHIP BETWEEN ENGINE OIL VISCOSITY AND ENGINE PERFORMANCE. PT. 3," WARRENDALE, PA., 1978 P79-83
Rept. No. SAE-780375; 1978; 6REFS
PRESENTED AT 1978 SAE CONGRESS AND EXPOSITION, DETROIT, 27 FEB-3 MAR 1978.
Availability: IN HS-023 017

HS-023 025

FRICION POWER LOSS OF MINERAL AND SYNTHETIC LUBRICANTS IN A RUNNING ENGINE

THE PERFORMANCE OF SINGLE GRADE AND MULTIGRADE OILS AND SYNTHETIC OILS HAS BEEN EVALUATED IN TERMS OF FRICTION POWER LOSS USING AN ENGINE RUNNING ON THE TEST BED ACCORDING TO A MODIFIED MORSE PROCEDURE. THE RESULTS OBTAINED SHOW A GOOD CORRELATION BETWEEN THE ENGINE PERFORMANCE AND THE RHEOLOGICAL PROPERTIES OF THE LUBRICANTS. THE VERY LOW FRICTION POWER LOSS EXPERIENCED WHEN USING LUBRICANTS CONTAINING POLYMER CAN BE EXPLAINED BY INTRODUCING THE CONCEPT OF ANISOTROPIC EFFECTIVE VISCOSITY. BASED ON THE GOOD CORRELATION BETWEEN THE MEASURED AND CALCULATED FRICTION GENERATED IN MAIN BEARINGS, A METHOD HAS BEEN DEVISED FOR EVALUATING THE TEMPORARY VISCOSITY LOSSES OF MULTIGRADE OILS BY MEASURING THE ENGINE FRICTION POWER LOSS AND BEARING TEMPERATURES. TEMPORARY VISCOSITY LOSS DUE TO POLYMER ORIENTATION CAN BE DIVIDED INTO COMPONENTS OF CIRCUMFERENTIAL AND AXIAL DIRECTION. THE EXTENT OF TEMPORARY SHEAR LOSS SHOWN BY WIDE SPAN POLYMER CONTAINING MULTIGRADE OILS DEMONSTRATES THAT EFFECTIVE FUEL ECONOMY CAN BE ACHIEVED WITHOUT SWITCHING TO LOW VISCOSITY OILS, WHICH MIGHT CONTRIBUTE TO OTHER ENGINE PERFORMANCE PROBLEMS SUCH AS SCUFFING AND WEAR, OIL CONSUMPTION, DEPOSIT-INDUCED SURFACE IGNITION, AND OCTANE REQUIREMENT INCREASE.

by F. L. BADIALI; A. A. CASSIANI INGONI; G. PUSATERI
SNAMPROGETTI-PETROLEUM PRODUCTS LABS., MILAN, ITALY; AGIP, ROME, ITALY
Publ: HS-023 017 (SAE-SP-429), "THE RELATIONSHIP BETWEEN ENGINE OIL VISCOSITY AND ENGINE PERFORMANCE. PT. 3," WARRENDALE, PA., 1978 P85-95
Rept. No. SAE-780376; 1978; 14REFS
PRESENTED AT 1978 SAE CONGRESS AND EXPOSITION, DETROIT, 27 FEB-3 MAR 1978.
Availability: IN HS-023 017

HS-023 026

EUROPEAN ACTIVITY CONCERNING ENGINE OIL VISCOSITY CLASSIFICATION - PT. 2

THE CONTINUATION OF THE REVIEW OF EUROPEAN WORK IN THE FIELD OF ENGINE OIL VISCOSITY RELEVANT TO THE REVISION OF SAE J 300 CLASSIFICATION COVERS LOW AND HIGH TEMPERATURE ASPECTS. THE WORK IS COORDINATED WITHIN COORDINATING EUROPEAN COUNCIL (CEC) INVESTIGATION GROUP IGL-8 AND IGL-9. THE REPLIES OF EUROPEAN ENGINE BUILDERS TO THE SAE QUESTIONNAIRE ON LOW TEMPERATURE EXPERIENCE HAVE INDICATED THAT LOW TEMPERATURE VISCOMETRIC REQUIREMENTS DIFFER WIDELY AMONG EUROPEAN ENGINES AS AMONG U.S. ENGINES. THE BORDERLINE PUMPING TEMPERATURE DETERMINED WITH FOUR ASTM (AMERICAN SOCIETY OF TESTING AND MATERIALS) PUMPABILITY REFERENCE OILS ON EIGHT DIFFERENT EUROPEAN ENGINES HAS SHOWN A WIDE SPECTRUM OF ENGINE SENSITIVITY, ALTHOUGH THE AVERAGE RESULTS ARE SIMILAR TO THOSE OF ASTM. EUROPEAN OPINION CONCERNING METRIFICATION OF SAE J 300 IS STRONGLY IN FAVOR OF INCORPORATING THE 15W GRADE INTO THE MAIN BODY OF THE TABLE AND OF ASSIGNING MINIMUM VISCOSITY VALUES TO THE W GRADES IN ORDER TO AVOID CONFUSION. THE IGL-9 WORK ON HIGH TEMPERATURE ASPECTS HAS CONCENTRATED ON LABORATORY VISCOSITY MEASUREMENTS OF SEVEN MULTIGRADE OILS AT DIFFERENT TEMPERATURES AND RATES OF SHEAR. SOME OF THE ASTM CONCLUSIONS REACHED ON LOW TEMPERATURE PUMPABILITY ARE CONFIRMED BY THE WORK WITH EUROPEAN ENGINES, FROM WHICH THE FOLLOWING CONCLUSIONS ARE DRAWN. BORDERLINE PUMPING TEMPERATURE (BPT) AND FAILURE MODE DATA FROM THE DGMK PROGRAM CAN HELP TO EVALUATE THE ABILITY OF LABORATORY APPARATUS TO PREDICT ENGINE OIL PUMPABILITY AT LOW TEMPERATURES. POUR POINT (ASTM D 97) AND COLD CRANKING SIMULATOR VISCOSITY (ASTM D 2602) DO NOT CORRELATE WITH BPT IN ENGINES. ENGINE DESIGN AND OIL CHARACTERISTICS SIGNIFICANTLY AFFECT LOW-TEMPERATURE FLOW AND PUMPABILITY PERFORMANCE. PUMPABILITY FAILURES ARE OFTEN DUE TO INSUFFICIENT FLOW TO THE OIL SCREEN OR BETWEEN SCREEN AND OIL PUMP, ALTHOUGH INLET TUBE LENGTH AND INTERNAL DIAMETER ARE ALSO DETERMINING FACTORS. THERE APPEARS TO BE ADEQUATE SAFETY MARGIN BETWEEN STARTABILITY LIMITS AND BPT. TIMES FOR OILS TO REACH ROCKER ARMS CAN VARY BY A FACTOR OF 15, THE LONGEST TIME BEING ABOUT FIVE MINUTES.

by C. G. A. EBERAN-EBERHORST; G. F. DI LELIO; A. A. CASSIANI INGONI
COORDINATING EUROPEAN COUNCIL
Publ: HS-023 017 (SAE-SP-429), "THE RELATIONSHIP BETWEEN ENGINE OIL VISCOSITY AND ENGINE PERFORMANCE. PT. 3," WARRENDALE, PA., 1978 P97-109
Rept. No. SAE-780377; 1978; 7REFS
PRESENTED AT 1978 SAE CONGRESS AND EXPOSITION, DETROIT, 27 FEB-3 MAR 1978.
Availability: IN HS-023 017

INJURY PATTERNS WITH AND WITHOUT SEAT BELTS [AUSTRALIA]

A DETAILED ANALYSIS WAS MADE OF THE INJURIES RECEIVED BY 387 FATALLY INJURED OCCUPANTS OF CARS AND ALLIED VEHICLES FROM THE FIRST TWO YEARS OF THE PATTERN OF INJURY SURVEY MADE IN VICTORIA, AUSTRALIA, BY THE ROYAL AUSTRALASIAN COLL. OF SURGEONS FROM MAY 1971, USING HOSPITALS' AND CORONERS' DATA. THE MORE COMMON INJURIES AMONG FATALITIES WERE IDENTIFIED AS FRACTURES OF THE SKULL, FACIAL BONES, CHEST AND THIGH, HEMOTHORAX, AND DAMAGE TO THE BRAIN, LUNGS, AORTA, SPLEEN, AND LIVER. THE INJURIES OF FATALLY INJURED OCCUPANTS WITH AND WITHOUT SEAT BELTS WERE COMPARED. THE INJURY PATTERNS OF 6526 OCCUPANT CASUALTIES FROM THE SAME TWO YEARS WERE ALSO ANALYZED. WHILE THE INJURIES COMMONLY ASSOCIATED WITH FATALITIES WERE MUCH LESS COMMON AMONG THE CASUALTIES, ALL EXCEPT SPLEEN DAMAGE WERE FOUND TO BE SIGNIFICANTLY MORE LIKELY TO HAVE BEEN SUSTAINED BY OCCUPANTS NOT WEARING SEAT BELTS. WHIPLASH INJURY AND TRANSIENT CERVICAL SPINAL CORD DAMAGE, WHICH WERE APPARENTLY NOT COMMON AMONG FATALITIES, WERE FOUND TO OCCUR SIGNIFICANTLY MORE OFTEN TO SEAT-BELT WEARERS. CRITICAL DIFFERENCES BETWEEN RESTRAINED AND UNRESTRAINED OCCUPANT CASUALTIES WERE FOUND ON A NUMBER OF VARIABLES WHICH, AS WELL AS SEATBELT WEARING, WERE POTENTIALLY RELATED TO CRASH SEVERITY (AS EXPERIENCED BY THE OCCUPANT) AND INJURY SUSCEPTIBILITY. COMPARISONS OF THE INJURY PATTERNS OF BELTED AND UNBELTED NONEJECTED FRONT OUTBOARD SEAT OCCUPANT CASUALTIES, CONTROLLING FOR CRASH LOCATION, VEHICLE SIZE, IMPACT DIRECTION, AND OCCUPANT AGE AND SEX, IN TURN SUGGESTED THAT THE DIFFERENCES IN INJURY PATTERNS OBSERVED FOR ALL OCCUPANT CASUALTIES WERE SUBSTANTIALLY DUE TO SEAT BELTS ALONE. THE ABSENCE OF CRASH SEVERITY INFORMATION IN THE SURVEY DATA PREVENTED A DEFINITIVE EVALUATION OF THE EFFECT OF SEAT BELTS ALONE ON THE INJURY PATTERNS OF OCCUPANT CASUALTIES.

by M. H. CAMERON; P. G. NELSON
ROYAL AUSTRALASIAN COLL. OF SURGEONS
[AUSTRALIA]

1977; 59P 11REFS
PRESENTED AT 6TH INTERNATIONAL CONFERENCE,
INTERNATIONAL ASSOC. FOR ACCIDENT AND
TRAFFIC MEDICINE, MELBOURNE, 31 JAN-4 FEB 1977.
SUPPORTED BY COMMONWEALTH DEPT. OF
TRANSPORT, AUSTRALIA.

Availability: DEPARTMENT OF TRANSPORT OF
AUSTRALIA, BOX 1839, G.P.O., MELBOURNE, VIC. 3001,
AUSTRALIA

THE EVOLUTION OF THE CSV [CREW SAFETY VEHICLE] WATER TENDER AND ITS SAFETY CAB [UNITED KINGDOM]

DESIGN AND CONSTRUCTION OF A SIX-PERSON CREW SAFETY CAB FOR WATER TENDERS (FIRE PUMPERS) ARE DESCRIBED. THE CREW SAFETY VEHICLE (CSV) PROVIDES OCCUPANT PROTECTION COMMENSURATE WITH HEAVIER AND MORE POWERFUL FIRE APPARATUS, INCREASED TRAFFIC DENSITY, AND HIGHER SPEEDS. EXISTING SAFETY LEGISLATION, HERE REVIEWED, WAS FOUND TO HAVE LIMITED RELEVANCE TO WATER TENDER OCCUPANT SAFETY. A SET OF SAFETY STANDARDS WAS THEREFORE DEVELOPED, IN KEEPING WITH ACTUAL ACCIDENT CONDITIONS. THE CSV CAB UNDERWENT TESTS FOR ROOF CRUSH, FRONTAL IMPACT, SIDE INTRUSION, AND WATER TANK MOUNTING STRENGTH. ECONOMIC COMMISSION FOR EUROPE (ECE) REGULATIONS 11 AND 21 TESTS WERE MADE FOR DOOR LATCHES AND HINGES, AND INTERIOR FITTINGS. SEAT ANCHORAGES AND EQUIPMENT MOUNTINGS WERE ALSO TESTED. THE TESTS REVEALED THAT THE STANDARDS HERE DEVELOPED ARE ACHIEVABLE AND IT IS RECOMMENDED THAT THEY BE INCORPORATED INTO FUTURE WATER TENDER STRENGTH REQUIREMENTS.

by R. A. L. ROSE

Publ: INSTITUTION OF MECHANICAL ENGINEERS,
AUTOMOBILE DIV., PROCEEDINGS V191 N35/77 P177-85
(1977)

1977; 5REFS

PREPARED FOR PRESENTATION AT ORDINARY
MEETING OF AUTOMOBILE DIV., LUTON, ENGLAND,
18 OCT 1977.

Availability: SEE PUBLICATION

HS-023 029

PERFORMANCE AND EMISSION PREDICTIONS FOR A MULTI-CYLINDER SPARK IGNITION ENGINE

A COMPARISON IS MADE OF EXPERIMENTAL RESULTS AND PREDICTIONS OF PERFORMANCE AND EMISSIONS FROM A MULTICYLINDER SPARK IGNITION ENGINE OVER A RANGE OF AIR/FUEL RATIOS AND TWO THROTTLE SETTINGS. THE RESULTS SHOWED THAT A SIMPLIFIED TWO ZONE COMBUSTION MODEL, A SEVEN REACTION SCHEME FOR NITRIC OXIDE FORMATION, A PARTIAL FREEZING MODEL FOR CARBON MONOXIDE AND THE INCLUSION OF CHEMICAL REACTIONS AND VARIABLE SPECIFIC HEAT ALONG THE PATHLINES IN THE WAVE EQUATIONS GAVE GOOD AGREEMENT WITH THE MEASUREMENTS AT THE COMMON PIPE JUNCTION AND EXHAUST OUTLET. DUE TO CYCLIC DISPERSION AND MALDISTRIBUTION OF FUEL BETWEEN CYLINDERS, HOWEVER, THE PREDICTIONS OF THE EMISSIONS IN THE EXHAUST MANIFOLD ADJACENT TO THE CYLINDER WERE NOT

SO GOOD. THE PREDICTED AIR FLOW AND INDICATED POWER AGREED WELL WITH EXPERIMENT.

by R. S. BENSON; P. C. BARUAH

SRC-B/SR/3876

Publ: INSTITUTION OF MECHANICAL ENGINEERS, COMBUSTION ENGINES GROUP, PROCEEDINGS V191 N32/77 P339-54 (1977)

1977; 19REFS

SPONSORED BY SCIENCE RES. COUNCIL.

Availability: SEE PUBLICATION

HS-023 030

THE ANALYSIS AND DESIGN OF A FIRE ENGINE SAFETY CAB USING FINITE ELEMENT METHODS

A THREE-DIMENSIONAL STRUCTURAL COLLAPSE ANALYSIS COMPUTER PROGRAM IS DESCRIBED, AND ILLUSTRATED BY REFERENCE TO A SAFETY VEHICLE STRUCTURE ANALYZED AND DESIGNED USING THE PROGRAM. THE PARTICULAR PROBLEMS OF LARGE DISPLACEMENTS AND MATERIAL NON-LINEARITY ARE ACCOUNTED FOR, AND A METHOD OF ESTIMATING THE PERMANENT SET WHICH RESULTS AFTER IMPACT IS DESCRIBED. BASED ON AN INCREMENTAL FORMULATION OF THE CONVENTIONAL FINITE-ELEMENT METHOD, THE COMPUTER PROGRAM IS CAPABLE OF TRACING THE COMPLETE LOAD DEFLECTION CHARACTERISTICS OF A STRUCTURE UP TO AND BEYOND THE POINT OF COLLAPSE, EXCEPT FOR A NUMBER OF LOCALIZED EFFECTS. THE YIELD-STRESS OF A MATERIAL CANNOT BE GUARANTEED TO WITHIN A FEW PERCENT, PREVENTING AN EXACT FAILURE LOAD PREDICTION. THE MODEL, ALTHOUGH DESIGNED FOR A FRAMEWORK WITH CLADDING, IS ADAPTABLE TO A STRUCTURE OF MONOCOQUE CONSTRUCTION. ANALYSES ARE DESCRIBED FOR ROOF CRUSH, FRONT IMPACT, AND DOOR SIDE-INTRUSION.

by J. C. MILES; G. A. WARDILL

Publ: INSTITUTION OF MECHANICAL ENGINEERS, AUTOMOBILE DIV., PROCEEDINGS V191 N29/77 P187-93 (1977)

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PREPARED FOR PRESENTATION AT ORDINARY MEETING OF AUTOMOBILE DIV., LUTON, ENGLAND, 18 OCT 1977.

Availability: SEE PUBLICATION

HS-023 031

TEMPERATURE DISTRIBUTIONS AND THERMAL DISTORTIONS OF BRAKE DRUMS

CALCULATED RESULTS ARE PRESENTED OF TRANSIENT TEMPERATURE DISTRIBUTIONS AND THE RESULTING DRUM DISTORTIONS WHEN BAND CONTACT OCCURS BETWEEN THE RUBBING SURFACES DURING OPERATION OF A BRAKE. THE FINITE ELEMENT METHOD IS USED TO COMPUTE THE THERMAL DISTORTION IN DRUMS WHEN INCOMPLETE CONTACT ARISING FROM PREVIOUS DISTORTION, MANUFACTURING TOLERANCES OR SHOE MISALIGNMENT OCCURS. THE RESULTS ARE COMPARED WITH THOSE OBTAINED WHEN THERE IS COMPLETE CONTACT BETWEEN LINING AND DRUM.

BOTH SINGLE AND REPEATED BRAKE APPLICATIONS MADE AT REGULAR INTERVALS WITH CONVECTIVE COOLING ARE CONSIDERED.

by R. J. ASHWORTH; M. EL-SHERBINY; T. P. NEWCOMB

Publ: INSTITUTION OF MECHANICAL ENGINEERS, AUTOMOBILE DIV., PROCEEDINGS V191 N19/77 P169-76 (1977)

1977; 8REFS

Availability: SEE PUBLICATION

HS-023 032

THE ROLLING WHEEL - THE DEVELOPMENT OF THE PNEUMATIC TYRE [TIRE] [UNITED KINGDOM]

A REVIEW IS PRESENTED OF THE EARLY DEVELOPMENT OF THE PNEUMATIC TIRE FOR THE CYCLE INDUSTRY, FOLLOWED BY AN EXAMINATION OF THE PROGRESS MADE TOWARDS COMFORT, DURABILITY, AND SAFETY FOR THE AUTOMOBILE THROUGH TIRE DEVELOPMENT, AS WELL AS FUTURE PROSPECTS. INCREASED TIRE DURABILITY AND PASSENGER COMFORT WERE BROUGHT ABOUT MAINLY BY IMPROVEMENTS IN TIRE CASINGS FROM CANVAS THROUGH NYLON AND POLYESTER TO GLASS AND STEEL, AND FROM CROSS PLY THROUGH PARALLEL CORD AND BIAS PLY TO RADIAL PLY. THE QUALITY OF RUBBER HAS ALSO BEEN IMPROVED AND SYNTHETICS HAVE BEEN DEVELOPED. SAFETY FEATURES IN TIRES INCLUDE IMPROVED CORNERING ABILITY, WET ROAD GRIP, AND AIR RETENTION (ESPECIALLY WITH THE TUBELESS TIRE). RECENT DEVELOPMENTS HAVE CENTERED ON SPARE WHEELS OF REDUCED WEIGHT AND VOLUME, AND ON DEVICES TO PREVENT A PUNCTURED TIRE FROM COMPLETELY DEFLATING, AS IN THE "DENOVO." FUTURE DEVELOPMENTS ENVISIONED COULD INCLUDE AUTOMATION OF TIRE MANUFACTURING PROCESSES, AND ELIMINATION OF FABRIC REINFORCEMENT IN THE CASINGS.

by G. R. SHEARER

Publ: INSTITUTION OF MECHANICAL ENGINEERS, AUTOMOBILE DIV., PROCEEDINGS V191 N11/77 P75-87 (1977; 2REFS

PREPARED FOR PRESENTATION AT ORDINARY MEETING OF AUTOMOBILE DIV., LONDON, 5 APR 1977.

Availability: SEE PUBLICATION

HS-023 033

SEAT BELTS - SOME ASPECTS OF COMPULSORY WEARING IN NEW SOUTH WALES, AUSTRALIA

THE EFFECTS OF COMPULSORY SEATBELT WEARING WERE EVALUATED FOR NEW SOUTH WALES, THE MOST POPULOUS AUSTRALIAN STATE. WEARING RATES ARE NOW VERY HIGH AND ALTHOUGH SURVEYS HAVE SHOWN INCREASING ACCEPTANCE OF THE SAFETY VALUE OF BELTS, A SIZABLE MINORITY OF MOTORISTS APPARENTLY ONLY WEAR THEIR BELTS BECAUSE OF THE LAW. COMPULSORY BELT WEARING APPEARS TO HAVE SAVED A SUBSTANTIAL NUMBER OF VEHICLE OCCUPANT LIVES, WITH

THE MAIN SAVING BEING AMONG YOUNG ADULTS. URBAN DEATHS APPEAR TO HAVE BEEN AFFECTED MORE THAN RURAL DEATHS. THERE IS TENTATIVE EVIDENCE OF REDUCTIONS IN SERIOUS INJURIES AMONG OCCUPANTS. A SIDE EFFECT OF THE LAW HAS BEEN INCREASED USAGE OF RESTRAINING SYSTEMS FOR YOUNG CHILDREN.

by R. G. VAUGHAN

Publ: INSTITUTION OF MECHANICAL ENGINEERS, AUTOMOBILE DIV., PROCEEDINGS V191 N3/77 P31-8 (1977)

1977; 31REFS

Availability: SEE PUBLICATION

HS-023 034

VEHICLE DETECTION USING A MAGNETIC FIELD SENSOR

THE MEASUREMENT OF VEHICLE MAGNETIC MOMENTS IS DESCRIBED AND THE RESULTS REPORTED FROM USE OF A FLUXGATE MAGNETIC SENSOR TO ACTUATE A LIGHTING SYSTEM BY THE MAGNETIC FIELDS OF PASSING VEHICLES. A TYPICAL U.S. AUTOMOBILE HAS A MAGNETIC MOMENT OF ABOUT 200 AMPERE-METERS SQUARED, COMPARED TO 2000 FOR A SCHOOL BUS. WHEN A VEHICLE IS MODELED AS AN IDEAL MAGNETIC DIPOLE WITH A MOMENT OF 200 AMPERE-METERS SQUARED, THE PREDICTED RESULTS FROM AN ANALYSIS OF THE SENSOR-VEHICLE GEOMETRY AGREE CLOSELY WITH OBSERVATIONS OF THE SYSTEM RESPONSE TO AUTOMOBILES. THE FLUXGATE SENSOR HAS BEEN WIDELY USED FOR DETECTING WEAPONS AT AIRPORT SECURITY GATES, AND HAS POSSIBILITIES FOR TRAFFIC SENSOR APPLICATION.

by STANLEY V. MARSHALL

Publ: IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY VVT-27 N2 P65-8 (MAY 1978)

1978; 4REFS

Availability: SEE PUBLICATION

HS-023 035

NON-CONTACT INSPECTION IN THE AUTOMOTIVE INDUSTRY TODAY

NONCONTACT QUALITY CONTROL GAUGING AND INSPECTION ARE INCREASING DUE TO IMPROVED TECHNOLOGY AND HARDWARE. AMONG CURRENT FORMS OF NONCONTACT INSPECTION ARE THE LASER AND ITS ELECTRO-OPTICAL DESCENDANTS. LASER TECHNIQUES INCLUDE PROFILE IMAGE, DIFFRACTIVE WAVE IMAGE, SCANNED BEAM, AND FOCUSED IMAGE. THE TV CAMERA HAS BECOME AN IMPORTANT INSPECTION TOOL AS AN INEXPENSIVE DETECTOR OF COMPONENT PRESENCE IN THE ASSEMBLY PROCESS. FIBER OPTICS REPRESENT A SCIENTIFIC BREAKTHROUGH IN NONCONTACT INSPECTION, FROM FLAW DETECTION TO COMPLEX RECOGNITION CAPABILITY, ASSISTED BY A MINI COMPUTER. AMONG THE APPLICATION AREAS OF NONCONTACT BASED INSPECTION SYSTEMS ARE FAULTS IN ASSEMBLY OR MANUFACTURING, FLAWS, MISSING OR WRONG COMPONENT, ALIGN-

MENT, AND SORTING. FAILURE MODE EVALUATION ANALYSIS IS RECOMMENDED FOR CHOOSING THE NONCONTACT INSPECTION METHOD BEST SUITED TO THE PROCESS TO BE CONTROLLED, WITH CONSIDERATION OF SUCH QUESTIONS AS PRODUCTION AREA ENVIRONMENT, CLEANLINESS OF PARTS, PRODUCTION RATES, AND MACHINE PROCESSING CAPABILITY.

by JOHN P. CORRUNKER, JR.

FORD MOTOR CO., TRANSMISSION AND CHASSIS DIV. Rept. No. SAE-780062; 1978; 7P

TECHNICAL PAPER SERIES. PREPARED FOR PRESENTATION AT SAE CONGRESS AND EXPOSITION, DETROIT, 27 FEB-3 MAR 1978.

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HS-023 036

SOCIAL LEARNING APPROACHES TO HEALTH EDUCATION: UTILIZATION OF INFANT AUTO RESTRAINT DEVICES

THE EFFECTIVENESS OF THREE EDUCATIONAL APPROACHES WAS ASSESSED IN PURCHASING PROPER INFANT AUTO RESTRAINTS. ONLY 37% OF CONTROL FAMILIES HAD PURCHASED AN ACCEPTABLE CAR SEAT, COMPARED TO 54% OF THOSE WHO HAD RECEIVED DESCRIPTIVE LITERATURE ALONE, 71% OF THOSE WHO HAD RECEIVED LITERATURE AND HAD BEEN SHOWN A DESCRIPTIVE FILM, AND 60% OF THOSE WHO HAD BEEN GIVEN LITERATURE, SHOWN THE FILM, AND HAD BEEN PROVIDED WITH A DEMONSTRATION OF AN ACCEPTABLE CAR SEAT. PURCHASE OF CHILD SAFETY SEATS WAS POSITIVELY CORRELATED WITH SOCIAL CLASS AND KNOWLEDGE OF AUTO SAFETY, BUT NOT WITH HISTORY OF AUTO ACCIDENTS. THE STUDY WAS CONDUCTED FOR TEN WEEKS IN THE MATERNITY WARD OF GROUP HEALTH HOSPITAL AMONG POSTPARTUM MOTHERS AND THE DATA WERE OBTAINED BY FOLLOW-UP QUESTIONNAIRE.

by DAVE B. ALLEN; ABRAHAM B. BERGMAN
HEW-5S01-RR05655-06; CPSC-PS340

Publ: PEDIATRICS V58 N3 P323-8 (SEP 1976)

1976; 12REFS

Availability: SEE PUBLICATION

HS-023 037

EFFECT OF THE NATIONAL SPEED LIMIT ON THE SEVERITY OF HEAVY-TRUCK ACCIDENTS

THREE CLASSES OF RURAL HIGHWAYS IN INDIANA WERE EVALUATED TO DETERMINE TRUCK ACCIDENT RATES. FATALITIES, PROPERTY DAMAGE, AND PERSONAL INJURY RATES INVOLVING HEAVY TRUCKS WERE COMPUTED AND THE CHANGES ANALYZED STATISTICALLY FOR EACH TYPE OF ACCIDENT SINCE THE IMPOSITION OF THE 55 MPH SPEED LIMIT. THE TOTAL COST OF ACCIDENTS IN TERMS OF CURRENT DOLLARS WAS COMPUTED AND THE CHANGES IN ACCIDENT COST ANALYZED AS ABOVE. THE RESULTS SHOWED A SIGNIFICANT CHANGE IN THE HEAVY TRUCK ACCIDENT RATE AFTER IMPOSITION OF THE 55 MPH SPEED LIMIT. ON

INTERSTATE HIGHWAY SYSTEMS THERE WAS A DECREASE IN ALL TYPES OF ACCIDENTS, WHILE ON THE FOUR-LANE AND TWO-LANE HIGHWAYS THERE WAS A SIGNIFICANT DECREASE ONLY IN PERSONAL INJURY ACCIDENTS. ALTHOUGH THE HEAVY TRUCK ACCIDENT RATES DECREASED, THE COST OF ACCIDENTS PER 100 MILLION VEHICLE-MILES SHOWED NO SIGNIFICANT CHANGE. THE REDUCTION IN ACCIDENT RATES ON INTERSTATE HIGHWAYS MAY BE DUE TO REDUCED DIFFERENCE IN SPEED BETWEEN HEAVY TRUCKS AND PASSENGER CARS.

by AHMED ESSAM RADWAN; KUMARES C. SINHA
 Publ: TRAFFIC QUARTERLY V32 N2 P319-28 (APR 1978)
 1978; 7REFS
 SUPPORTED BY PURDUE UNIV., JOINT HWY. RES.
 PROJ. AND INDIANA STATE HWY. COMMISSION.
 Availability: SEE PUBLICATION

HS-023 038

**EVALUATION OF THE STATUTORY
 CLASSIFICATION OF THREE-WHEELED,
 MOTORIZED INVALID VEHICLES
 [TRANSPORTATION FOR THE HANDICAPPED]**

IN RESPONSE TO AN OBJECTION BY INTERESTED INDIVIDUALS TO THE FACT THAT VIRGINIA LAW CLASSIFIES THREE-WHEELED, MOTORIZED INVALID VEHICLES AS MOTORCYCLES AND SUBJECTS THEM TO ALL REGISTRATION, SAFETY INSPECTION, AND OPERATOR REQUIREMENTS APPLICABLE TO OTHER VEHICLES IN THAT CATEGORY, THE HWY. SAFETY DIV. OF VIRGINIA REQUESTED THAT THE VIRGINIA HWY. AND TRANSPORTATION RES. COUNCIL POLL 15 STATES WHICH PERMIT OR PROHIBIT THE USE OF SUCH VEHICLES ON PUBLIC HIGHWAYS IN ORDER TO EVALUATE A REQUEST BY THE OBJECTING INDIVIDUALS FOR A CHANGE IN THE CLASSIFICATION. THE SURVEY OF STATES DISCLOSED WIDELY DIFFERING DEGREES OF REGULATION AND AN ABSENCE OF CONCISE DATA WITH RESPECT TO THE NUMBER OF INVALID VEHICLES IN USE, THE DEGREE TO WHICH THEY ARE INVOLVED IN ACCIDENTS, AND THE FREQUENCY OF THEIR USE. AREAS OF USE MAY BE ACCURATELY PREDICTED, AS THE TRIP PURPOSES MOST OFTEN CITED WERE SHOPPING, MEDICAL SERVICES, RECREATION, AND LIVELIHOOD. ON THE BASIS OF THE INFORMATION OBTAINED IN THE SURVEY, IT IS RECOMMENDED THAT VIRGINIA'S LAW BE AMENDED TO CREATE A SPECIAL VEHICLE CLASSIFICATION FOR MOTORIZED INVALID CHAIRS. PUBLIC SAFETY WOULD APPEAR TO REQUIRE SOME FORM OF SAFETY INSPECTION PRIOR TO OPERATION OF THESE VEHICLES, AS WELL AS CERTIFICATION OF OPERATORS BY LICENSING OR BY PHYSICIANS. MINIMUM EQUIPMENT COULD BE REQUIRED, SUCH AS BRAKE LIGHTS, HORN, TURN SIGNALS, AND DISPLAY OF A SLOW MOVING VEHICLE EMBLEM.

by MICHAEL D. BALL
 VIRGINIA HWY. AND TRANSPORTATION RES.
 COUNCIL, CHARLOTTESVILLE, VA.
 Rept. No. VHTRC-78-R43; 1978; 18P 5REFS
 Availability: CORPORATE AUTHOR

HS-023 039

**ENGINE PERFORMANCE AND FIRE-SAFETY
 CHARACTERISTICS OF WATER-CONTAINING
 DIESEL FUELS. INTERIM REPORT**

RECENT FLAMMABILITY EVALUATIONS CONDUCTED AT U.S. ARMY FUELS AND LUBRICANTS RES. LAB. (ADLRL) HAVE SHOWN THAT WATER-CONTAINING DIESEL FUELS ARE MORE FIRE RESISTANT (EVEN AT TEMPERATURES ABOVE THE FLASH POINT) THAN THE SAME FUEL WITHOUT THE WATER ADDED. THESE FINDINGS LED TO THIS PROJECT TO EVALUATE THE COMPATIBILITY OF SUCH FUELS WITH A FULL SCALE DIESEL ENGINE. BLENDS OF BASE DIESEL FUEL PLUS 2% EMULSIFYING AGENT PLUS AS MUCH AS 10% WATER WERE EVALUATED IN AN UNMODIFIED LDT-465-1C, A MULTIFUEL DIESEL ENGINE WITH WIDE FIELD USAGE. NO SIGNIFICANT CHANGES WERE OBSERVED IN POWER OUTPUT WHEN OPERATING THE ENGINE AT EQUAL BASE FUEL FLOW RATES. THE SMOKE-REDUCTION EFFECTS WERE INCONCLUSIVE, BUT THE NONVISIBLE EMISSIONS WERE SUBSTANTIALLY ALTERED. OXIDES OF NITROGEN EMISSIONS WERE DECREASED AS MUCH AS 30% BUT WERE ACCOMPANIED BY A 250% INCREASE IN UNBURNED HYDROCARBONS. POTENTIAL FIRE-SAFETY BENEFITS AND A LACK OF MAJOR DETRIMENTAL EFFECTS IN THE ENGINE MAKE THESE WATER/FUEL BLENDS ATTRACTIVE CANDIDATES FOR FIRE-RESISTANT COMBAT FUELS.

by EDWIN C. OWENS; BERNARD R. WRIGHT
 ARMY FUELS AND LUBRICANTS RES. LAB.,
 SOUTHWEST RES. INST., P.O. DRAWER 28510, SAN
 ANTONIO, TEX. 78284
 DAAK02-75-C-0082; DAAG53-76-C-0003
 Rept. No. AD/A-036-011; AFLRL-83; 1976; 25P 14REFS
 Availability: NTIS

HS-023 040

**POINT-FOLLOWER AUTOMATIC VEHICLE
 CONTROL: A GENERIC ANALYSIS. FINAL REPORT**

THE GENERIC CHARACTERISTICS WERE INVESTIGATED OF THE POINT-FOLLOWER (OR MOVING-CELL) APPROACH TO THE CONTROL OF LONGITUDINAL SPEED AND SPACING OF VEHICLES IN AN AUTOMATED GUIDEWAY TRANSIT (AGT) SYSTEM. VEHICLES WERE CONSTRAINED TO FOLLOW ELECTRONIC SIGNALS THAT MOVE ALONG THE GUIDEWAY WITH PREDETERMINED SPEEDS AND SPACINGS. A KINEMATIC ANALYSIS WAS MADE OF POINT-FOLLOWER CONTROL DURING SPEED TRANSITIONS AND POINT-TRANSFER MANEUVERS THAT ARE GENERALLY REQUIRED TO RESOLVE MERGE CONFLICTS. THIS ANALYSIS CONSIDERS THE EFFECTS OF OPERATIONAL PARAMETERS SUCH AS LINE SPEED, ACCELERATION AND JERK LIMITS, VEHICLE LENGTH, HEADWAY, AND LENGTH OF MANEUVERING REGIONS TO ACCOMPLISH MERGES. A DYNAMIC ANALYSIS OF POINT-FOLLOWER CONTROL WAS FORMULATED AS A PROBLEM IN CLASSIC CONTROL THEORY. THE TRAFFIC MERGING PROBLEM WAS ADDRESSED BY DEVELOPMENT OF QUASISYNCHRONOUS CONTROL ALGORITHMS FOR

RESOLUTION OF MERGE CONFLICTS AT NETWORK INTERSECTIONS OF VARIOUS GEOMETRIES. THE PERFORMANCE OF EACH ALGORITHM DEVELOPED IN THE STUDY WAS EVALUATED BY COMPUTER SIMULATION. TYPICAL RESULTS FOR THE BETTER, MORE COMPLEX ALGORITHM SHOW THAT RE-ROUTINGS ARE REQUIRED FOR LESS THAN 3% OF THE VEHICLES PASSING THROUGH AN INTERSECTION AT 90% OF FLOW CAPACITY, BASED ON THE KNOWLEDGE OF 12 POINTS ON EACH INCOMING LINK. THE PERFORMANCES OF THE MERGE-CONTROL ALGORITHMS CAN BE IMPROVED IF A POLICY OF PROVIDING PRIORITY SERVICE TO OCCUPIED AS OPPOSED TO EMPTY VEHICLES IS ADAPTED.

by S. J. BROWN, JR.
JOHNS HOPKINS UNIV., APPLIED PHYSICS LAB.,
JOHNS HOPKINS RD., LAUREL, MD. 20810
DOT-UT-30010
Rept. No. UMTA-MD-06-0022-77-1; PB-270 354; 1977; 159P
11REFS
Availability: NTIS

HS-023 041

MOTOR VEHICLE STATISTICS. 1976 STATISTICAL DATA [NEW YORK]

ACCIDENT DATA FOR 1975-1976 IN NEW YORK STATE ARE SUMMARIZED AND REPORTABLE ACCIDENTS AND ACCIDENT RATES TABULATED. INFORMATION FROM FORM MV-213 IS TABULATED BY COUNTY ON MOTOR VEHICLE REGISTRATIONS, LICENSES, FEES COLLECTED, DEDUCTIONS, AND MONIES AVAILABLE FOR DISTRIBUTION. INFORMATION PROVIDED BY FORM MV-144A IS SUMMARIZED, INCLUDING STATEWIDE ACCIDENT STATISTICS AND THOSE FOR NEW YORK CITY, WITH SPECIAL TABULATIONS OF STATEWIDE ACCIDENTS INVOLVING PEDESTRIANS, BICYCLES, MOTORCYCLES, OR SCHOOL BUSES. SUSPENSIONS AND REVOCATIONS OF LICENSES ARE ENUMERATED BY REASON FOR THE ACTION. MOTORBOAT AND SNOWMOBILE REGISTRATIONS ARE ENUMERATED BY COUNTY.

by JOAN A. SCHUFF, ED.
NEW YORK STATE DEPT. OF MOTOR VEHICLES,
ALBANY, N.Y. 12228
Rept. No. RD-20; 1977; 36P
Availability: CORPORATE AUTHOR

HS-023 042

THE SIMULATOR AS A DRIVER TESTING DEVICE

THE DRIVING SIMULATOR WAS EVALUATED AS A PRACTICAL DEVICE FOR THE PARTIAL AUTOMATION OF THE DRIVER LICENSE ROAD TEST, SINCE THE PRESENT ON-STREET ROAD TEST IS INADEQUATE FOR TESTING EXPRESSWAY AND EMERGENCY DRIVING SITUATIONS AND IS BECOMING OVERLY COSTLY AND DIFFICULT TO ADMINISTER IN URBAN AREAS WITH HEAVY TRAFFIC. RESULTS OF PROJECT DATA ANALYSIS INDICATE THAT THE DRIVING SIMULATOR CAN PERFORM AS A SCREENING DEVICE TO INDICATE IF A NOVICE DRIVER IS COMPETENT TO ATTEMPT THE ON-STREET ROAD TEST. EXAMINATION RESULTS ALSO INDICATE THAT THE

SIMULATOR EXAMINATION COULD BE USEFUL IN THE RETESTING OF DRIVERS AT LICENSE RENEWAL. THE EXAMINATION IS CAPABLE OF DISCRIMINATING BETWEEN GROUPS OF DRIVERS BASED UPON THEIR DRIVING EXPERIENCE, ESPECIALLY IN THE DEFENSIVE DRIVING AREAS OF BRAKING, USE OF TURN SIGNALS, AND REACTION TO EMERGENCY SITUATIONS. MODIFICATIONS IN TESTING EQUIPMENT AND PROGRAMMING ARE NECESSARY TO INCREASE HARDWARE RELIABILITY AND TO PROVIDE MORE DATA ON THE RELATIONSHIP OF THE SIMULATED AND ROAD DRIVING TASKS. THESE MODIFICATIONS WOULD INCREASE THE DISCRIMINATING POWER OF THE EXAMINATION AND ENHANCE THE ABILITY OF THE EXAMINEE TO CONTROL HIS VEHICLE IN THE SIMULATED DRIVING ENVIRONMENT. MODIFICATIONS RECOMMENDED ARE THOSE PROVIDING THE EXAMINEE WITH MORE INFORMATION ON THE STATUS OF HIS VEHICLE CONTROLS TO REPLACE THE FEEDBACK CUES ON INERTIAL FORCES AND SPATIAL ORIENTATION NORMALLY OBTAINED FROM STEERING, ACCELERATING, AND BRAKING. FURTHER RESEARCH IS RECOMMENDED TO PROVIDE DATA ON THE ACTUAL DRIVING ACTIONS OF EXAMINEES, SINCE THERE MAY BE MORE THAN ONE CORRECT REACTION TO A DRIVING SITUATION. THE SIMULATOR EXAMINATION WAS UNABLE TO DISCRIMINATE BETWEEN GROUPS OF DRIVERS BASED UPON THEIR PREVIOUS MOTOR VEHICLE ACCIDENT AND CONVICTION RECORDS.

by JOHN F. O'BRIEN
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OF RES. AND DEVEL., EMPIRE STATE PLAZA,
ALBANY, N.Y. 12228
1977; 49P
Availability: CORPORATE AUTHOR

HS-023 069

AUTOMOTIVE PROPULSION (PROPULSION AUTOMOBILE), VOL. 1. REPORT BY THE AUTOMOTIVE PROPULSION SYSTEMS PILOT STUDY

FOLLOWING PRELIMINARY REMARKS, THE KEYNOTE ADDRESS, AND GOVERNMENT/INDUSTRY SUMMARY REPORTS BY FRANCE, WEST GERMANY, ITALY, NETHERLANDS, UNITED KINGDOM, UNITED STATES, CANADA, AND JAPAN, 39 PAPERS ARE SUMMARIZED WITH PERTINENT COMMENTS, QUESTIONS, AND ITEMS OF DISCUSSION UNDER THE BROAD CATEGORIES OF GAS TURBINES, STIRLING AND RANKINE, DIESEL, AND STRATIFIED CHARGE ENGINES, AND SPARK IGNITION IMPROVEMENTS. GAS TURBINE TOPICS INCLUDE CATALYTIC COMBUSTION, AN ENGINE-EMISSION CONTROL SYSTEM, THE FIAT 6803 ENGINE, INTERMITTENT FUEL INJECTION, THREE SHAFT TURBINE-TRANSMISSION SYSTEMS, CERAMIC TECHNOLOGY FOR ROTORS, TRANSIT COACH APPLICATIONS, HEAVY DUTY GAS TURBINES, CERAMIC PROOF TESTING, NETSHAPE INTEGRAL AND CERAMIC BLADED WROUGHT SUPERALLOY ROTORS, COMPLIANT FOIL AIR BEARINGS, CERAMIC REGENERATOR CORE DESIGN, AND ALUMINOUS KEATITE AS CORE MATERIAL. STIRLING AND RANKINE ENGINE TOPICS INCLUDE

DEVELOPMENT OF 40-150 KW AND D-CYCLE VAPOR STIRLING ENGINES, A THIRD GENERATION CARTER STEAM SYSTEM, AND AN ORGANIC RANKINE BOTTLING CYCLE FOR LONG HAUL DIESEL TRUCKS. DIESEL ENGINE TOPICS INCLUDE GASEOUS EMISSIONS CONTROL, THE "SQUISH LIP" LOW POLLUTION DIESEL, FLASH RADIOGRAPHIC TECHNIQUE FOR FUEL INJECTION SPRAYS, AN ADVANCED LOW EMISSION CONCEPT, AND A DESIGN FOR ENERGY EFFICIENT AND LOW POLLUTING DIESELS IN CARS. STRATIFIED ENGINE TOPICS INCLUDE DESIGNS BY VOLKSWAGEN AND BRITISH LEYLAND, A TWO-CYCLE ENGINE, THE COMBUSTION PROCESS OF A THREE-VALVE ENGINE, A RETROFIT FUEL VAPOR METERING SYSTEM WITH TORCH IGNITION AND MULTIFUEL CAPABILITY, AN UPDATE OF THE DIRECT INJECTED ROTARY ENGINE AT CURTISS-WRIGHT, AND THE NAVAL ACADEMY BALANCED HEAT ENGINE. SPARK IGNITION IMPROVEMENTS INCLUDE OPERATING WITH LEAN MIXTURES, COMPACT GAS GENERATOR DEVELOPMENT, THE EFFECT OF VALVE SIZES ON FUEL CONSUMPTION AND EXHAUST EMISSIONS, CLOSED LOOP CONTROL OF SPARK ADVANCES, AND EXHAUST GAS RECYCLING.

NORTH ATLANTIC TREATY ORGANIZATION (NATO), COM. ON THE CHALLENGES OF MODERN SOCIETY (COMITE SUR LES DEFIS DE LA SOCIETE MODERNE) Rept. No. CONF-770430/1-VOL-1; UC-96-VOL-1; NATO/CCMS-N-61-VOL-1; 1978; 529P REFS
PROCEEDINGS OF 4TH INTERNATIONAL SYMPOSIUM ON AUTOMOBILE PROPULSION SYSTEMS, WASHINGTON, D.C., 18-22 APR 1977. SEE ALSO HS-020 886, HS-021 056, HS-021 072, HS-021 148, AND HS-021 234. INCLUDES HS-020 362, HS-020 884, HS-020 887--HS-020 904, HS-021 073--HS-021 084, HS-021 235--HS-021 238, HS-023 070--HS-023 071. VOL. 2 IS HS-023 072.
Availability: CORPORATE AUTHOR

HS-023 070

ALUMINOUS KEATITE - A NEW CERAMIC REGENERATOR CORE MATERIAL

THE HISTORY OF CERAMIC ROTARY REGENERATOR CORE DEVELOPMENT IS TRACED, THE DEVELOPMENT OF CORNING CODE 9460 ALUMINOUS KEATITE IS DESCRIBED, AND A SUMMARY PRESENTED OF THE TESTING NOW BEING DONE. THE DEVELOPMENT AND PERFORMANCE OF A NEW THIN-WALL STRUCTURE (T14-20) IS DISCUSSED, WHICH UTILIZES A SHEET ONLY 0.08 MM THICK. THE IMPROVED STABILITY OF ALUMINOUS KEATITE TOWARD SODIUM SHOULD HELP MAINTAIN LONGER REGENERATOR LIFE EVEN IN HIGH SALT ENVIRONMENTS. BECAUSE OF A THERMAL MISMATCH PROBLEM, AN APPROACH IS BEING STUDIED TO DEVELOP AN ACCEPTABLE FUSION-BOND MATERIAL WITH A THERMAL EXPANSION TO MATCH THAT OF THE ALUMINOUS KEATITE. ANOTHER APPROACH IS BEING EXPLORED TO USE THE BEST AVAILABLE FUSION-BOND MATERIAL TO PRODUCE AN ACCEPTABLE MATRIX HUB CORE, LEADING TO THE DEVELOPMENT OF THE "MATCH BOND" CONCEPT. THE RIM MOUNT-RIM DRIVE CORE SUPPORT SYSTEM IS BEING USED SATISFACTORILY IN FORD 707 GAS TURBINES. CORES OF THIN-WALL CONSTRUCTION MADE OF THE NEW ALUMINOUS KEATITE CERAMIC ARE

BEING EVALUATED BY FORD AND BY THE DETROIT DIESEL ALLISON DIV. OF GENERAL MOTORS. THERE HAS BEEN SOME DIFFICULTY IN THE ELASTOMER MOUNTING OF THE METAL RING GEAR TO THE THIN-WALL CODE 9460 MATRIX. FORD HAS MODIFIED THEIR BONDING PROCEDURE TO USE THE THIN-WALL MATRIX, BUT CORNING IS DEVELOPING A METHOD WHICH WILL ALLOW FORD TO USE THEIR STANDARD MOUNTING PROCEDURE.

by D. G. GROSSMAN
CORNING GLASS WORKS, CORNING, N.Y.
Publ: HS-023 069, "AUTOMOTIVE PROPULSION, VOL. 1," WASHINGTON, D.C., 1978 P235-47
1978; 3REFS
PRESENTED AT 4TH INTERNATIONAL SYMPOSIUM ON AUTOMOTIVE PROPULSION SYSTEMS, WASHINGTON, D.C., 18-22 APR 1977.
Availability: IN HS-023 069

HS-023 071

A NEW LOOK AT EXHAUST GAS RECYCLE AND ITS POTENTIAL FOR IMPROVING FUEL FLEXIBILITY AND ECONOMY OF SPARK IGNITION ENGINES

ENGINE OPTIMIZATION BY UNIFORM CHARGE MODIFICATION IS EXPLORED AS AN APPROACH TO FUEL ECONOMY AND FLEXIBILITY, RATHER THAN THE MORE NARROW OBJECTIVES OF EXHAUST GAS RECYCLE. SOME THEORETICAL AND EXPERIMENTAL BACKGROUND IS REVIEWED TO IDENTIFY SOME OF THE MORE SIGNIFICANT FACTORS CHARACTERIZING THE INTERACTION OF THE ENGINE AND THE CHEMICAL MAKE-UP OF THE CYLINDER CHARGE. SOME EXPLORATORY ENGINE TEST DATA WERE OBTAINED TO GAIN ADDITIONAL APPRECIATION FOR SOME OF THE POSSIBILITIES FOR CHARGE MODIFICATION USING CERTAIN SPECIES FOUND IN THE ENGINE EXHAUST. WHEN THE CHARGE IS ENRICHED IN CARBON DIOXIDE, WATER AND FORMALDEHYDE, HIGHER BRAKE THERMAL EFFICIENCY LEVELS CAN BE OBTAINED AT PART THROTTLE DUE TO A COMBINATION OF FACTORS SUCH AS IMPROVED IGNITION AND FLAME PROPAGATION IN WEAK MIXTURES, MODERATED COMBUSTION, AND INCREASED TORQUE AT MBT SPARK TIMING. THE DATA SUGGEST THAT WHEN CERTAIN DIRECTIONAL CHARGE MODIFICATIONS ARE MADE, WEAKER MIXTURES, GREATER SPARK ADVANCE, AND LOWER OCTANE FUELS (HIGH PARAFFIN, LEAD-FREE) MAY BE FAVORED TO OBTAIN SIGNIFICANT MILEAGE INCREASES WITH LOW EMISSIONS AND GOOD DRIVEABILITY.

by A. LOWI
HARKER INDUSTRIES, ANNANDALE, VA.
Publ: HS-023 069, "AUTOMOTIVE PROPULSION, VOL. 1," WASHINGTON, D.C., 1978 P510-5
1978
PRESENTED AT 4TH INTERNATIONAL SYMPOSIUM ON AUTOMOTIVE PROPULSION SYSTEMS, WASHINGTON, D.C., 18-22 APR 1977.
Availability: IN HS-023 069

HS-023 072

**AUTOMOTIVE PROPULSION (PROPULSION
AUTOMOBILE), VOL. 2. REPORT BY THE
AUTOMOTIVE PROPULSION SYSTEMS PILOT
STUDY**

FIFTY-TWO PAPERS ARE SUMMARIZED WITH PERTINENT COMMENTS, QUESTIONS, AND ITEMS OF DISCUSSION UNDER THE BROAD CATEGORIES OF AUTOMOTIVE EMISSIONS, POWERTRAIN COMPONENTS, VEHICLE IMPROVEMENTS, ALTERNATIVE FUELS, AND ELECTRIC AND HYBRID SYSTEMS. THESE ARE FOLLOWED BY CONCLUDING REMARKS AND LISTS OF OFFICIAL DELEGATES, ATTENDEES, AND EXHIBITORS, INCLUDING SOME PHOTOGRAPHS OF EXHIBITS. AUTOMOTIVE EMISSIONS TOPICS INCLUDE THE VEHICLE TEST PROGRAM OF THE U.S. POSTAL SERVICE, DEVELOPMENT OF CATALYSTS FOR EXHAUST EMISSION CONTROL, EMISSION CONTROL OF V-ENGINES WITH OXYGEN SENSORS, TEST PROCEDURES, DIESEL EXHAUST ODOR MEASUREMENTS, IMPACT OF EXHAUST EMISSIONS IN MOTOR TRAFFIC AIR POLLUTION CONTROL, HYDROGEN ENGINE NITROGEN OXIDE CONTROL BY WATER INDUCTION, AND THE EFFECT OF METHANOL ON EMISSIONS FROM A CARBURETED SPARK IGNITION ENGINE. POWERTRAIN COMPONENT TOPICS INCLUDE AN ELECTRONICALLY CONTROLLED GEARBOX, PROGRAMMABLE CONTROLS, ANALYSIS OF TRANSMISSION MODIFICATIONS FOR VEHICLE PERFORMANCE, DRIVETRAIN MODIFICATIONS FOR FUEL ECONOMY, DESIGN OF HYDROMECHANICAL TRANSMISSIONS, AND THE INERTIAL STORAGE TRANSMISSION. VEHICLE IMPROVEMENT TOPICS INCLUDE AERODYNAMIC DRAG EFFECT ON FUEL ECONOMY, ENERGY FOR ROAD TRANSPORT, SYSTEMS ANALYSIS OF ALTERNATIVE DRIVE UNITS FOR HEAVY TRUCKS, AND COMBINING ENGINE COOLING WITH HEAT DRIVEN AIR CONDITIONING TO IMPROVE FUEL ECONOMY. ALTERNATIVE FUELS TOPICS INCLUDE METHANOL (PLAIN OR BLENDED WITH OTHER FUELS SUCH AS INDOLINE), ALCOHOL FUELS, LPG (LIQUIFIED PETROLEUM GAS) AND METHANOL, ACETYLENE, HYDROGEN-FUELED RECIPROCATING ENGINES, SINGLE CYLINDER HYDROGEN ENGINE, REFORMED FUEL, REFUELING HYDROGEN TRANSIT FLEETS, AND ALCOHOLS AND GASEOUS FUELS FROM BIOMASS. ELECTRIC AND HYBRID SYSTEMS TOPICS INCLUDE HYBRID HEAT ENGINE PROPULSION FOR URBAN BUSES, POWERTRAIN DEVELOPMENT, FLYWHEEL ENERGY MANAGEMENT AUTOMOBILE, FLYWHEEL ELECTRIC MOTOR HYBRID POWERTRAIN, FIAT ELECTRIC CITY CAR PROTOTYPE, FLYWHEEL-BATTERY HYBRID POWER SYSTEM, REDUCING LEAD-ACID BATTERY MAINTENANCE, PERFORMANCE STANDARDS, FLYWHEEL PROPULSION FOR URBAN BUSES, UPGRADING OF EVA (ELECTRIC VEHICLE ASSOCIATES, INC.) ELECTRIC VEHICLE WITH FLYWHEEL/BATTERY HYBRID POWERTRAIN, FOUR-PASSENGER ELECTRIC CAR DESIGN, A PERFORMANCE BASIS FOR EVALUATING

ELECTRIC AUTOMOBILES, AND PERFORMANCE CAPABILITY OF NEAR-TERM VEHICLES.

NORTH ATLANTIC TREATY ORGANIZATION (NATO), COM. ON THE CHALLENGES OF MODERN SOCIETY Rept. No. CONF-770430/1-VOL-2; UC-96-VOL-1; NATO/CCMS-N-61-VOL-2; 1978; 518P REFS PROCEEDINGS OF 4TH INTERNATIONAL SYMPOSIUM ON AUTOMOBILE PROPULSION SYSTEMS, WASHINGTON, D.C., 18-22 APR 1977. SEE ALSO HS-020 886, HS-021 056, HS-021 072, HS-021 148, AND HS-021 234. INCLUDES HS-021 057--HS-021 071, HS-021 149--HS-021 155, HS-021 157--HS-021 162, HS-021 164, HS-021 239--HS-021 253, HS-021 731, HS-023 073--HS-023 076. VOL. 1 IS HS-023 069.

Availability: CORPORATE AUTHOR

HS-023 073

**DESIGN FACTORS OF HYDRO-MECHANICAL
TRANSMISSIONS FOR PASSENGER CARS**

THE POTENTIAL OF THE CONTINUOUSLY VARIABLE TRANSMISSION (CVT) FOR TRANSPORTATION ENERGY CONSERVATION IS EXPLORED AND A STATE-OF-THE-ART CVT OPERATING IN U.S. PRODUCTION AUTOMOBILES IS DEMONSTRATED. TWO GENERATIONS OF HYDROMECHANICAL TRANSMISSION (HMT) PROTOTYPES WERE DEVELOPED. THE TASKS OF NOISE REDUCTION AND IMPROVEMENT OF THE EFFICIENCY OF THE AUXILIARY HYDRAULIC CIRCUIT WERE ALSO UNDERTAKEN. COMMERCIALY AVAILABLE HYDROSTATIC UNITS WERE USED IN THE FIRST GENERATION PROTOTYPE, BUT HAD THE SECOND GENERATION PROTOTYPE SPECIALLY DESIGNED HYDRAULIC UNITS. THE AVAILABLE DATA INDICATE THAT BOTH HMT PROTOTYPES PROVIDE SLIGHTLY GREATER ENGINE AND TRANSMISSION EFFICIENCY (FEDERAL COMPOSITE CYCLE) AND FUEL ECONOMY. THE FUEL ECONOMY COMES ALMOST ENTIRELY FROM THE ENGINE CHARACTERISTICS, WITH ONLY A SMALL PART DUE TO TRANSMISSION EFFICIENCY. ENGINE REDESIGN IS RECOMMENDED TO PROVIDE THE BEST OVERALL PERFORMANCE WITH THE INTEGRATED ENGINE/CVT POWER TRAIN. IN-VEHICLE TESTING OF THE FIRST GENERATION PROTOTYPE SHOWED 20% INCREASED HYDROCARBON AND THREEFOLD INCREASED CARBON MONOXIDE EMISSIONS ON THE CVS HOT START CYCLE. STEADY STATE OPERATION SHOWED A 50% DECREASE IN CO. THE HMT CAUSED AN INCREASE IN NITROGEN OXIDES OF APPROXIMATELY 25%. TRADE-OFFS OF FUEL ECONOMY IMPROVEMENT AGAINST NITROGEN OXIDE REDUCTION MAY BE ACHIEVED BY ALTERING THE ENGINE OPERATING SCHEDULE OR THE EXHAUST GAS RECIRCULATION VALVE TIMING, BY SPARK ADVANCE, OR BY A COMBINATION OF THESE.

by P. HUNTLEY
ORSHANSKY TRANSMISSION CORP., SAN DIEGO,
CALIF.
Publ: HS-023 072, "AUTOMOTIVE PROPULSION, VOL. 2,"
WASHINGTON, D.C., 1978 P651-71
1978
PRESENTED AT 4TH INTERNATIONAL SYMPOSIUM
ON AUTOMOTIVE PROPULSION SYSTEMS,
WASHINGTON, D.C., 18-22 APR 1977.
Availability: IN HS-023 072

HS-023 074

ALTERNATIVE FUELS - THE OUTLOOK AND OPTIONS WITHIN THE NEXT DECADE

IT IS FORECAST THAT AUTOMOBILE FUEL TO THE YEAR 2000 WILL BE PRIMARILY CONVENTIONAL HYDROCARBON LIQUIDS: GASOLINE, DIESEL, OR BROADCUT FUEL (GASOLINE PLUS DISTILLATES). FOR THE NEAR TERM, FUELS SUCH AS HYDROGEN AND AMMONIA CAN BE RULED OUT, DUE TO THE NEED FOR NEW PRODUCTION, DISTRIBUTION, AND ENGINE FUEL SYSTEM TECHNOLOGIES, AND SERVICE FACILITIES. FUELS FROM ALTERNATIVE SOURCES INCLUDE METHANOL FROM COAL OR OTHER SOLIDS, SYNCRUDE OR TRADITIONAL FUELS FROM COAL, AND SHALE OIL EXTRACT PROCESSED TO FINISHED FUELS. ALL OF THESE DEPEND ON DEVELOPMENT OF HIGH EFFICIENCY ENGINES USING METHANOL OR ETHANOL TO FUEL CAPTIVE FLEETS, OR ON FAVORABLE FUEL CHARACTERISTICS ATTAINABLE BY AROMATICITY OF FUELS FROM COAL SYNCRUDE OR BY PARAFFINICITY OF FUELS FROM SHALE. ENGINE TECHNOLOGY OPTIONS INCLUDE LEAN-BURN OR STOICHIOMETRIC AIR/FUEL ADJUSTMENT. SOME VERSION IS LIKELY OF A STRATIFIED-CHARGE OR HIGH-TURBULENCE LEAN-BURN COMBUSTION SYSTEM. SOPHISTICATED AIR/FUEL OR TIMING CONTROL WILL PERMIT USE OF HIGHEST COMPRESSION AND TIMING ADVANCE COMPATIBLE WITH EMISSION CONSTRAINTS. STRATIFIED-CHARGE CONCEPTS WILL REDUCE FUEL SENSITIVITY, PERMIT INCREASE IN COMPRESSION RATIO, AND PROVIDE IMPROVED ENGINE EFFICIENCY WITH LOW OCTANE FUELS. A PARALLEL CONCEPT COULD IMPROVE DIESEL ENGINES TO REDUCE COMPRESSION RATIOS FOR REDUCED ENGINE FRICTION AND ENGINE CRITICALITY FACTORS. DEVELOPMENT IS ENVISIONED OF A HIGH-TURBULENCE SPARK IGNITION, LEAN-BURN ENGINE TO PERMIT USE OF HIGH COMPRESSION RATIO. THIS TYPE OF ENGINE COULD TAKE ADVANTAGE OF SOME ALTERNATIVE, HIGH QUALITY FUELS. ADAPTATION OF POSITIVE FUEL METERING AND DISTRIBUTION MAY BE MADE TO HIGH COMPRESSION RATIO ENGINES FOR USE WITH ALCOHOLS, POSSIBLY FEATURING EXHAUST HEAT RECOVERY. IT IS CONCLUDED THAT PURE ALCOHOLS COULD BE EXCELLENT FUEL. THE TECHNOLOGY AND EXPERTISE EXIST FOR ENGINE MODIFICATIONS FROM CURRENT DESIGNS, SUBJECT TO THE AVAILABILITY OF AN ALCOHOL. DISTRIBUTION AND CONSUMER USE PROBLEMS ARE FORESEEN, WHICH COULD BE DEFINED BY FLEET EXPERIENCE. THE ONE-STEP CONVERSION OF COAL TO GASOLINE SEEMS TO BE THE ONLY NEAR-TERM POSSIBILITY OF OBTAINING FUELS FROM SOLIDS, AND THIS WOULD ALTER ENGINE TECHNOLOGY FORECASTS. LIMITED AVAILABILITY OF DIESEL FUEL INDICATES THAT OVER-

COMMITMENT TO DIESEL TECHNOLOGY SHOULD BE AVOIDED.

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BARTLESVILLE ENERGY RES. CENTER,
BARTLESVILLE, OKLA.
Publ: HS-023 072, "AUTOMOTIVE PROPULSION, VOL. 2,"
WASHINGTON, D.C., 1978 P732-5
1978
PRESENTED AT 4TH INTERNATIONAL SYMPOSIUM
ON AUTOMOTIVE PROPULSION SYSTEMS,
WASHINGTON, D.C., 18-22 APR 1977.
Availability: IN HS-023 072

HS-023 075

PERIPHERAL EQUIPMENT FOR REDUCING MAINTENANCE OF ELECTRIC VEHICLE LEAD-ACID BATTERIES [ABSTRACT]

DEVELOPMENTS IN "PERIPHERAL COMPONENTS" OF ELECTRIC VEHICLE BATTERIES ARE DESCRIBED FOR EASIER MAINTENANCE AND SUPERVISION OF THE BATTERY AND ITS PERFORMANCE. FACTORS WHICH REDUCE THEORETICAL BATTERY LIFE INCLUDE LIMITED UTILIZATION OF ACTIVE MATERIAL, NECESSARY DILUTION, EXCESS ACID, OR SECONDARY COMPONENTS SUCH AS GRID, CURRENT COLLECTOR, SEPARATORS, CONTAINERS, ETC. CENTRAL TOPPING-UP SYSTEMS FOR EASY REFILLING OF THE BATTERY ARE ILLUSTRATED, AS ARE CATALYTIC RECOMBINATION DEVICES. INDICATORS FOR MONITORING ACID DENSITY ARE ALSO ILLUSTRATED, AS WELL AS BATTERY COOLING DEVICES FOR HEAVY DUTY BATTERIES.

by K. SALAMON
VARTA BATTERIE AG, FEDERAL REPUBLIC OF GERMANY
Publ: HS-023 072, "AUTOMOTIVE PROPULSION, VOL. 2,"
WASHINGTON, D.C., 1978 P876-89
1978
PRESENTED AT 4TH INTERNATIONAL SYMPOSIUM
ON AUTOMOTIVE PROPULSION SYSTEMS,
WASHINGTON, D.C., 18-22 APR 1977.
Availability: IN HS-023 072

HS-023 076

PERFORMANCE CAPABILITY OF NEAR-TERM ELECTRIC AND HYBRID VEHICLES [SUMMARY]

THE BARRIERS TO THE ACCEPTANCE OF THE ELECTRIC VEHICLE (EV) BY THE PUBLIC INCLUDE: RANGE OR DISTANCE POSSIBLE ON A BATTERY CHARGE, MAINTENANCE FACILITIES, POOR ACCELERATION, SIZE, INITIAL COST, RECHARGE TIME, AND BATTERY LIFE. THE WEIGHT OF THE BATTERIES REPRESENTS STILL ANOTHER BARRIER, IN THAT VEHICLE PERFORMANCE IS A FUNCTION OF VEHICLE WEIGHT. ALTHOUGH NEAR-TERM EV'S DO NOT MATCH THE PERCEIVED NEEDS OF PASSENGER CAR USERS, SEVERAL DO MEET THE "USE" PATTERNS FOR MANY MOTORISTS. IN ADDITION, THE EV APPEARS TO OFFER A BETTER OVERALL EFFICIENCY AND WOULD THUS BE CHEAPER TO OPERATE. THIS SPREAD IN COSTS IS EXPECTED TO INCREASE

AS THE COST OF PETROLEUM CONTINUES TO RISE FASTER THAN ELECTRICITY. OTHER ADVANTAGES THAT MAKE THE EV PROMISING ARE ITS POTENTIAL FOR LONGER LIFE AND LOWER MAINTENANCE COSTS, AND IN VOLUME PRODUCTION THEY SHOULD COST LESS AS WELL. PERHAPS A HYBRID VEHICLE -- COMBINING THE ENERGY ECONOMY OF EV WITH THE RANGE OF AN INTERNAL COMBUSTION ENGINE (ICE) VEHICLE -- OFFERS THE KEY TO MARKET ACCEPTANCE IN THE NEAR TERM. THE MAJOR PROBLEMS FACING EV'S ARE WEIGHT AND COST OF THE BATTERY, PROBLEM OF EDUCATING THE USER, AND BUILDING AN INFRASTRUCTURE TO SUPPORT THE INDUSTRY. GRAPHS ARE PROVIDED, COMPARING THE ECONOMY AND PERFORMANCE OF THE EV, ICE VEHICLE, AND HYBRID VEHICLE IN TERMS OF ENERGY EFFICIENCY AND ECONOMY, FUEL COSTS, PERCENT OF TOTAL U.S. ENERGY BY USE, ACCELERATION CHARACTERISTICS, AND RANGE LIMITS.

by B. B. UNDERHILL

ARTHUR D. LITTLE, INC.

Publ: HS-023 072, "AUTOMOTIVE PROPULSION, VOL. 2," WASHINGTON, D.C., 1978 P969-76

1978

PRESENTED AT 4TH INTERNATIONAL SYMPOSIUM ON AUTOMOTIVE PROPULSION SYSTEMS, WASHINGTON, D.C., 18-22 APR 1977.

Availability: IN HS-023 072

HS-023 077

THE PSYCHOLOGY OF CHILDREN IN TRAFFIC

OBSERVATIONS AND INVESTIGATIONS WERE UNDERTAKEN OF THE BEHAVIOR OF CHILDREN INTERACTING WITH VEHICLES IN ORDER TO OBTAIN INFORMATION FOR IMPROVING CHILD SAFETY. THE RESEARCH PROGRAM INCLUDES COOPERATIVE STUDIES WITH THE POLICE AND OTHER ORGANIZATIONS AS WELL AS RESEARCH FUNDED AT UNIVERSITIES. STUDIES WERE MADE CONCERNING CHILDREN'S UNDERSTANDING OF ROAD SAFETY AND THE DEVELOPMENT OF TEACHING AIDS TO BE USED IN ROAD SAFETY EDUCATION. CHILD PEDESTRIANS AND BICYCLISTS WERE STUDIED IN AN EFFORT TO IDENTIFY HAZARDOUS BEHAVIOR AND RISK. SOME REMEDIAL MEASURES SUCH AS PELICAN CROSSINGS HAVE REDUCED ACCIDENTS TO CHILDREN, AND A CROSSING CODE IS IN PROCESS OF DEVELOPMENT. A PUBLICITY CAMPAIGN LAUNCHED IN MAY 1971 FOR THE "GREEN CROSS CODE" RESULTED IN 11% REDUCTION IN CHILD CASUALTIES. SAFETY LITERATURE AIMED AT CHILDREN AND PICTORIAL TEACHING AIDS WERE EVALUATED, AS WAS INTRODUCTION OF ROAD SAFETY EDUCATION INTO THE SCHOOL CURRICULUM. QUESTIONNAIRES WERE USED FOR EVALUATION.

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Rept. No. TRRL-SR-295; PB-276 915; 1977; 21P 19REFS
PRESENTED AT CONFERENCE "CHILDREN, THE ENVIRONMENT, AND ACCIDENTS," MEDICAL COMMISSION ON ACCIDENT PREVENTION AND DEPT. OF CHILD HEALTH, UNIV. OF NEWCASTLE-UPON-

TYNE, ENGLAND, 24-25 SEP 1976, AND AT INTERNATIONAL CONFERENCE ON PEDESTRIAN SAFETY, ISRAEL, DEC 1976.

Availability: NTIS

HS-023 078

AFTER THE THAW (APRES THAW)

PREPARATION FOR SPRING AND SUMMER DRIVING INCLUDES CHECKING FOR SALT DAMAGE SUCH AS RUST, OR DAMAGE TO HOSES, FANBELT, AND UNDERHOOD WIRING, OR TO MUFFLER AND EXHAUST SYSTEM. REPLACEMENT OF SNOW TIRES AND CHECKING FOR TIRE DAMAGE, CHANGING WINDSHIELD WIPER BLADES AND REFILLING THE WASHER RESERVOIR ARE NECESSARY SPRING CLEANING ITEMS FOR AUTOMOBILES, AS IS CLEANING THE CAR INTERIOR. A SPRING TUNE-UP IS RECOMMENDED, INCLUDING CHOKE READJUSTMENT AND FILTER CHANGE, AS WELL AS FRONT WHEEL ALIGNMENT, LUBRICATION, AND SERVICING THE AIR CONDITIONING SYSTEM. SPRING ROAD HAZARDS OFTEN ENCOUNTERED ARE FOG, RAIN, AND WATER COVERED ROADS. DRIVING IN FOG SHOULD BE AVOIDED IF POSSIBLE; IF NOT, SLOW SPEED IS ESSENTIAL, WITH HEADLIGHTS ON LOW BEAM. USE OF FOG LIGHTS IS RECOMMENDED IF FOGGY CONDITIONS ARE FREQUENT. USING THE DEFROSTER WILL PREVENT MIST FORMATION INSIDE A VEHICLE. GOOD TIRE TREAD IS IMPORTANT ON WET ROADS, AND SLOW SPEED IS NECESSARY TO AVOID HYDROPLANING. HYDROPLANING DEPENDS ON AUTO SPEED, AMOUNT OF WATER ON THE ROAD, AMOUNT OF TIRE TREAD, AND AIR PRESSURE IN THE TIRES. LANE MARKINGS ARE SOMETIMES NOT VISIBLE IN WET WEATHER. DRIVING THROUGH DEEP PUDDLES CAN WET THE BRAKE LININGS AND REDUCE THEIR EFFECTIVENESS. BRAKES CAN BE DRIED BY DRIVING WITH THE BRAKE PEDAL DEPRESSED.

Publ: DRIVER V11 N11 P1, 3-7 (APR 1978)

1978

Availability: SEE PUBLICATION

HS-023 079

OWNERSHIP OF MOTOR VEHICLES IN WHICH PEOPLE ARE INJURED

ANALYSIS OF THE OWNERSHIP OF PASSENGER VEHICLES IN WHICH 172 PEOPLE WERE INJURED IN BALTIMORE COUNTY, MD., REVEALED THAT HALF WERE OCCUPANTS OF VEHICLES NO LONGER OWNED BY THE ORIGINAL PURCHASER; 59% DID NOT OWN THE VEHICLE IN WHICH THEY WERE INJURED; 21% OF THE DRIVERS AND 74% OF THE PASSENGERS WERE APPARENTLY NOT RELATED TO THE OWNER; 30% WERE LESS THAN 21 YEARS OF AGE. FEWER THAN ONE FOURTH OF THE INJURED WERE OWNERS AND ORIGINAL PURCHASERS OF THE VEHICLES IN WHICH THEY WERE INJURED. THESE FINDINGS INDICATE THAT SAFETY FEATURES SUCH AS PASSIVE RESTRAINTS PRIMARILY AFFECT A LARGER POPULATION THAN MERELY THE OWNERS OF NEW VEHICLES AND THESE FEATURES SHOULD

THEREFORE BE REQUIRED RATHER THAN OPTIONAL.

by SUSAN P. BAKER; WILLIAM HADDON, JR.
JOHNS HOPKINS SCHOOL OF HYGIENE AND PUBLIC
HEALTH, BALTIMORE, MD.; INSURANCE INST. FOR
HWY. SAFETY (IHS), WATERGATE 600, SUITE 300,
WASHINGTON, D.C. 20037
1978; 12P 7REFS
Availability: INSURANCE INST. FOR HWY. SAFETY,
WATERGATE 600, SUITE 300, WASHINGTON, D.C. 20037

HS-023 080

SIGHT DISTANCE REQUIREMENTS OF RURAL ROADS - A REVIEW

THE RESULTS ARE PRESENTED OF A STUDY INTO THE SIGHT DISTANCE REQUIREMENTS OF RURAL ROADS. ALTHOUGH A LITERATURE SEARCH, EXAMINATION OF SOME RESEARCH RESULTS, AND AN ANALYSIS OF THE PRACTICES OF VARIOUS ROAD AUTHORITIES PROVIDED NO CLEAR-CUT GUIDELINES FOR THE SETTING OF MINIMUM STANDARDS, SUFFICIENT KNOWLEDGE EXISTS TO ENABLE SATISFACTORY STANDARDS TO BE SET. THE TRADITIONAL CONCEPTS OF STOPPING AND OVERTAKING SIGHT DISTANCE ARE EXAMINED AND IT IS CONCLUDED THAT AN APPROACH SHOULD BE ADOPTED WHICH SIGNIFICANTLY REDUCES THE LENGTH OF CREST VERTICAL CURVE REQUIRED AT HIGH SPEEDS. CREST VERTICAL CURVES SHOULD BE DESIGNED ON THE BASIS OF MINIMUM SIGHT DISTANCE AND OVERTAKING CRITERIA SHOULD BE RELATED TO THE COST OF ACHIEVING THE STANDARD. SIGNIFICANT CHANGES IN THE DESIGN OF SAG VERTICAL CURVES ARE RECOMMENDED, BASED ON KNOWN PERFORMANCES OF HEADLIGHTS AND ALLOWING FOR PROBABLE IMPROVEMENTS. THESE CHANGES WILL RESULT IN THREEFOLD INCREASES IN THE LENGTH OF VERTICAL CURVE REQUIRED. ACCEPTABLE COMBINATIONS OF SIGHT DISTANCE, HORIZONTAL AND VERTICAL CURVATURE, CROSS SECTION, AND ACCESS POINTS SHOULD BE ESTABLISHED RATHER THAN MINIMA FOR THE INDIVIDUAL ELEMENTS.

by L. J. LOUIS
Publ: AUSTRALIAN ROAD RESEARCH V7 N2 P32-44
(JUN 1977)
1977; 32REFS
Availability: SEE PUBLICATION

HS-023 081

EVALUATION OF TRANSITION CURVE DESIGN PARAMETERS USING AN ANALYTICAL VEHICLE MODEL

A MODEL OF VEHICLE DYNAMIC BEHAVIOR IS PRESENTED, DESIGNED TO DETERMINE, QUANTITATIVELY, THE IMPLICATIONS FOR DRIVER AND VEHICLE OF ATTEMPTING TO FOLLOW A GIVEN CURVE, PRECISELY AS IT IS SET OUT. A PRESCRIBED-TRAJECTORY VEHICLE MODEL IS USED WHICH ALLOWS THE COMPUTATION OF THE STEER ANGLE HISTORY NECESSARY FOR THE VEHICLE TO

PRECISELY FOLLOW A GIVEN HORIZONTAL AND VERTICAL ROAD ALIGNMENT. IN NUMERICAL EXPERIMENTS, THE EFFECT OF CHANGING VARIOUS TRANSITION CURVE DESIGN PARAMETERS IS EXPLORED IN TERMS OF THE COMPATIBILITY BETWEEN THE ROADWAY INPUT VISIBLE TO THE DRIVER AND THE CONTROL RESPONSE REQUIRED OF HIM, AND IN TERMS OF THE TRANSIENT VEHICLE MOTIONS AND BODY FORCES EXPERIENCED. APPLICATION OF A STEER ANGLE DISTURBANCE CRITERION ESTABLISHES LIMITS ON DESIGN PARAMETERS WHICH ARE CONSISTENT AND ARE NOT VERY DIFFERENT FROM THOSE CURRENTLY EMPLOYED IN MANY DESIGN POLICIES. THE VEHICLE MODEL IS ALSO USED TO COMPARE THE CONSEQUENCES OF THE DIFFERENT DETAILED DESIGN PRACTICES EMPLOYED BY DIFFERENT HIGHWAY AUTHORITIES WHEN DESIGNING CURVES FOR THE SAME NOMINAL CONDITIONS. THIS APPLICATION OF A RELATIVELY COMPLEX VEHICLE MODEL TO THE COMPARISON OF ALTERNATIVE ROADWAY GEOMETRIES SHOWS PROMISE AS AN EVALUATION TOOL. HOWEVER, FURTHER WORK IS REQUIRED TO REFINE THE EVALUATION CRITERIA, PREFERABLY BY INCORPORATION OF A REALISTIC MODEL OF DRIVER STEERING CONTROL.

by M. C. GOOD
Publ: AUSTRALIAN ROAD RESEARCH V7 N2 P14-22
(JUN 1977)
1977; 17REFS
SUPPORTED BY AUSTRALIAN ROAD RES. BOARD.
Availability: SEE PUBLICATION

HS-023 082

EVALUATION OF IMPACT ATTENUATION DEVICES. A PRELIMINARY REPORT

IMPACT ATTENUATION DEVICES INVOLVED IN 50 ACCIDENTS WERE EVALUATED AND COMPARED, WITH CONSIDERATION GIVEN TO APPROPRIATENESS FOR A PARTICULAR SITE. INSTALLATION, COST, AND ACCIDENT DATA ARE PRESENTED FOR SAND CONTAINERS, HI-DRO CUSHION CELLS (SANDWICH AND CLUSTER) GUARD RAIL ENERGY ABSORBING TERMINALS (G-R-E-A-T), AND VERMICULITE CONCRETE DEVICES. ALSO DESCRIBED ARE TEMPORARY ATTENUATING DEVICES TO BE USED DURING HIGHWAY CONSTRUCTION AND REPAIRS. RESULTS INDICATE THAT INSTALLATION OF SAND CONTAINERS IS LEAST EXPENSIVE, BUT REPAIR INVOLVES THE HIGHEST AVERAGE COST. VERMICULITE WAS FOUND TO BE AESTHETICALLY SUPERIOR TO OTHER TYPES OF INSTALLATION, BUT SUBJECT TO EXCESSIVE WEATHERING AND BREAKUP UNDER ADVERSE WEATHER CONDITIONS. EVALUATION OF THE OTHER DEVICES IS CONTINUING. THE EFFECTIVENESS OF EACH SYSTEM WHERE ACCIDENTS HAVE OCCURRED IS EVIDENT BY THE NUMBER OF HIT AND RUN ACCIDENTS; TEN OUT OF 50 ACCIDENTS WERE INVESTIGATED BY LAW ENFORCEMENT OFFICERS. FEDERAL CRITERIA NOTICES FOR CRASH ATTENUATION DEVICES ARE INCLUDED.

VIRGINIA DEPT. OF HIGHWAYS AND
TRANSPORTATION, TRAFFIC AND SAFETY DIV.
1977; 79P
Availability: CORPORATE AUTHOR

HS-023 083

HS-023 083

MOTOR VEHICLE REAR LIGHTING AND SIGNALING: EFFECTS OF SPACING, POSITION, INTENSITY, AND COLOR. AN APPLIED-LITERATURE REVIEW. FINAL REPORT

THE CURRENT STATUS WAS DETERMINED OF RESEARCH DEALING WITH SPACING, POSITION, INTENSITY, AND COLOR OF REAR LIGHTING AND SIGNALING LAMPS ON MOTOR VEHICLES. THE RELEVANT DOMESTIC AS WELL AS INTERNATIONAL APPLIED RESEARCH IS INCLUDED. TABULAR SUMMARIES OF THE DESIGN, RESULTS, AND RECOMMENDATIONS OF 36 EXPERIMENTAL INVESTIGATIONS ARE PRESENTED, AS WELL AS REPRINTS OF THE ORIGINAL ABSTRACTS. RESULTS OF THE EXPERIMENTAL FINDINGS INDICATE THAT WIDEST SPACING OF LAMPS IS BEST. OPINIONS WERE DIVIDED ON LAMP POSITION. HIGH INTENSITY OF REAR SIGNALS AND HIGH RATIO OF SIGNAL TO TAIL LAMP WAS CONSIDERED DESIRABLE, WITH OPTIMAL INTENSITY VARYING WITH COLOR AND SIZE OF THE LAMPS. DIFFERENT COLORS WERE REPORTED TO REQUIRE DIFFERENT LEVELS OF INTENSITY FOR EQUIVALENT RATINGS OF BRIGHTNESS, VISIBILITY, AND EFFECTIVENESS.

by MICHAEL SIVAK
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INST., ANN ARBOR, MICH. 48109
Rept. No. UM-HSRI-78-8; 1978; 65P 6REFS
REPT. FOR JUL-DEC 1977. SPONSORED BY MOTOR
VEHICLE MANUFACTURERS ASSOC., INC., 320 NEW
CENTER BLDG., DETROIT, MICH. 48202.
Availability: CORPORATE AUTHOR

HS-023 084

COMPUTER MODELING OF TRANSPORTATION-GENERATED AIR POLLUTION. STATE-OF-THE-ART SURVEY 2. FINAL REPORT

UP-TO-DATE INFORMATION IS FURNISHED ON THE CHARACTERISTICS OF 22 CURRENTLY OPERATIONAL AIR POLLUTION DISPERSION MODELS SUITABLE FOR ANALYZING TRANSPORTATION-GENERATED POLLUTANTS, AND THE AVAILABILITY OF AIR QUALITY DATA ACQUIRED IN THE VICINITY OF 24 TRANSPORTATION SYSTEMS (E.G. HIGHWAYS AND AIRPORTS). THE COMPUTER MODELING OF INERT GASES, PARTICULATES, AND REACTIVE POLLUTANTS IS DISCUSSED WITH EMPHASIS ON MODEL TYPES, IMPLEMENTATION (I.E. INPUT DATA, COMPUTER REQUIREMENTS, OUTPUT) APPLICATIONS, MODEL VALIDATION AND AVAILABILITY. ALTHOUGH SOME PROGRESS HAS BEEN REGISTERED IN MODEL DEVELOPMENT DURING THE PAST FIVE YEARS AND DESPITE THE FACT THAT LIMITED VALIDATION OF SOME MODELS HAS BEEN ACHIEVED, NO MODEL IN CURRENT USE HAS BEEN ADEQUATELY TESTED AND EVALUATED. AIR QUALITY DATA NEAR TRANSPORTATION SYSTEMS ARE CATEGORIZED BY TYPE OF SITE, DATES OF DATA ACQUISITION, FUNDING SOURCE, AND DATA AVAILABILITY. THE QUALITY

OF THE 24 DATA SAMPLES REPORTED HERE IS UNKNOWN.

by EUGENE M. DARLING, JR.; JEFFREY D. GARLITZ
TRANSPORTATION SYSTEMS CENTER, KENDALL
SQUARE, CAMBRIDGE, MASS. 02142; INPUT OUTPUT
COMPUTER SERVICES, INC., 689 CONCORD AVE.,
CAMBRIDGE, MASS. 02138
Rept. No. DOT-TSC-RSPD-78-1; DOT-TSC-OST-78-6; 1978;
179P 21REFS
REPT. FOR JUL 1976-JUN 1977. UPDATE OF DOT-TSC-
OST-72-20, JUN 1972.
Availability: NTIS

HS-023 085

GLASS BEADS FOR HIGHWAY PAINT STRIPES

GLASS BEADS ARE RECOMMENDED AS ADDITIONS TO PAINTED HIGHWAY DIVIDER LINES BECAUSE OF BETTER NIGHT-TIME VISIBILITY, AND INCREASED DURABILITY OF PAINTED LINES. THE BEADS CONSIST OF GLASS SPHERES WITH MINIMUM REFRACTIVE INDICES OF 1.50, 1.65, AND 1.90, THE LOWEST INDEX BEADS BEING RECOMMENDED FOR HIGHWAY LINES, THE MIDDLE INDEX BEADS FOR SOME THERMOPLASTIC LINES, AND THE LARGEST ON AIRPORT RUNWAYS AND FOR VERTICAL SIGNS. GLASS BEADS ARE COATED WITH MOISTUREPROOF COATING TO KEEP THEM FREE-FLOWING UNDER ALL CONDITIONS. APPLICATION RESULTS DIFFER WITH ROAD SURFACE VARIABLES, SUCH AS DIRT, SUBSTRATE TEXTURE, AND CHEMICAL AND MECHANICAL PROPERTIES. THE PRESENCE OF RESIDUAL PAINT LINES, EXPANSION JOINTS, CRACKS, AND SEALANTS ADVERSELY AFFECTS LINE PERFORMANCE. OTHER VARIABLES IN APPLICATION INCLUDE BINDERS, EQUIPMENT, OPERATOR SKILL, AND AMBIENT CONDITIONS. A TECHNIQUE FOR EVALUATION OF HIGHWAY LINES WAS DEVELOPED BY COMPARING VISUALLY AND PHOTOGRAPHING SIDE-BY-SIDE DOUBLE LINES ON RURAL TWO LANE ROADS, ONE LINE BEING A BASE FOR COMPARISON AND THE OTHER OF EXPERIMENTAL COMPOSITION. EACH HALF-MILE TEST SECTION WAS EVALUATED VISUALLY AT NIGHT UNDER ALL WEATHER CONDITIONS AT NORMAL SPEED. DOCUMENTATION WAS PROVIDED BY DAY AND NIGHT COLOR MOVIES AND SLIDES OBTAINED AT REGULAR INTERVALS WITH A SPECIALLY EQUIPPED VAN UNTIL FAILURE. COLOR MICROPHOTOGRAPHS WERE ALSO TAKEN AT INTERVALS.

by JAMES R. RITTER
POTTERS INDUSTRIES, INC., HASBROUCK HEIGHTS,
N.J. 07604
Rept. No. FHWA-TS-78-213; 1978; 38P 6REFS
Availability: GPO

HS-023 086

BUS CONSTRUCTION STANDARDS STILL OBJECT OF DISAGREEMENT

THERE HAS BEEN LITTLE SUBSTANTIVE EVALUATION OF FEDERAL SCHOOLBUS STANDARDS ISSUED APR 1977. THE NATIONAL ASSOC. OF STATE DIRECTORS OF PUPIL TRANSPORTATION SERVICES

SEEKS A RETURN TO PRACTICAL PROBLEM-SOLVING TECHNIQUES PROVIDING A REASONABLE BALANCE BETWEEN SAFETY CONSIDERATIONS AND COST INCREASES. THE ASSOCIATION APPROVES OF THE STANDARDS FOR ROOF AND JOINT STRENGTH, AND FOR HYDRAULIC BRAKES, BUT DEPLORES THE SEAT SPACING REQUIREMENTS AND THE ANTI-SKID REQUIREMENT FOR BRAKES. THE NATIONAL SCHOOL TRANSPORTATION ASSOC. (NSTA) CONSIDERS THE SEATS TOO CLOSE TOGETHER, TOO HARD, AND UNCOMFORTABLE. NHTSA EXTENDED THE SEAT SPACING SPECIFICATIONS ONE INCH TO 21 INCHES AS A RESULT OF COMPLAINTS BY INDUSTRY GROUPS. NHTSA HAS ALSO RECOGNIZED THE NEED TO CONSIDER SUCH FACTORS AS COST, FLAMMABILITY, PRODUCIBILITY, RUGGEDNESS, ETC. WORK IS BEING DONE ON SCHOOLBUS IMPROVEMENTS SUCH AS A TUBULAR CAGE FOR FUEL TANKS, AND WIDER BRAKES. THE FEDERAL STANDARDS HAVE BROUGHT ABOUT INCREASED TESTING OF DESIGNS AND MATERIALS, BUT THERE HAS BEEN SOME DIFFICULTY WITH UNSPECIFIC WORDING IN SOME REQUIREMENTS AND SOME CONFLICTS WITH STATE REQUIREMENTS. BLUE BIRD BODY CO. STATED THAT THE STANDARDS REDUCE THE AMOUNT OF DESIGN FLEXIBILITY AND INCREASE THE LEAD TIME REQUIRED FOR ADEQUATE TESTING AND CERTIFICATION. FEDERAL SCHOOLBUS STANDARDS LACK EVALUATION OF BENEFITS AND DRAWBACKS FOR THE VERY REASON THAT THE SCHOOL BUS HAS THE LOWEST ACCIDENT AND INJURY RATE PER PASSENGER MILE OF ANY MOTOR VEHICLE TYPE.

Publ: SCHOOL BUS FLEET V23 N2 P18-22 (APR/MAY 1978)
1978
Availability: SEE PUBLICATION

HS-023 087

TEENAGE DRINKING AND DRIVING

A FRANK EXCHANGE OF IDEAS BETWEEN PARENTS AND TEENAGERS IS RECOMMENDED TO ALERT YOUNG PEOPLE TO THE DANGERS OF DRINKING AND DRIVING, OR OF RIDING WITH THOSE WHO DRINK AND DRIVE. PARENTAL EXAMPLE IS ALSO IMPORTANT, TO AVOID THE TEENAGERS' VIEW OF A DOUBLE STANDARD IN THESE MATTERS. FACTS ARE NEEDED TO MAKE THE RECOMMENDED DISCUSSIONS MEANINGFUL, SUCH AS THE EQUAL EFFECT OF A 12 OZ CAN OF BEER, AN OUNCE OF 100 PROOF LIQUOR, AND A SIX OZ GLASS OF WINE; THE INEFFECTUALITY OF COFFEE AND COLD SHOWERS ON DRUNKEN PEOPLE; THE DIFFERING EFFECT OF ALCOHOL ON DIFFERENT PEOPLE; THE EFFECT OF THE RATE OF DRINKING; THE FACT THAT DRUNKENNESS IS NOT ALWAYS APPARENT BY OUTWARD APPEARANCE; AND THAT INTOXICATION RESULTS IN PHYSICAL UNCOORDINATION, MENTAL CONFUSION, BLURRED VISION, AND LACK OF INHIBITION. IT MUST BE STRESSED IN DISCUSSING DRINKING AND DRIVING THAT THE PARENT IS CONCERNED ABOUT THE TEENAGER'S LIFE, FUTURE, AND HAPPINESS, NOT THE CAR OR INSURANCE PREMIUMS. PARENTS CAN ENCOURAGE TEENAGERS TO INFORM THEMSELVES ABOUT ALCOHOL AND ALCOHOLISM. A

RECOMMENDED BOOKLET IS "THE DRINKING QUESTION," (ADM)-76-286, BY THE DEPT. OF HEALTH, EDUCATION AND WELFARE. IT IS IMPORTANT TO DISCUSS MEASURES TO BE TAKEN FOR GETTING HOME SAFELY IF THE TEENAGER BECOMES INTOXICATED OR IS WITH FRIENDS WHO BECOME DRUNK. THE PARENT COULD AGREE TO BRING THE TEENAGER HOME, NO QUESTIONS ASKED, OR TO PROVIDE TAXI FARE, OR TO PERMIT AN OVERNIGHT STAY AT A FRIEND'S HOME IF THE TEENAGER IS ALREADY THERE. THE CHANNELS OF COMMUNICATION MUST BE KEPT OPEN SO THAT THE TEENAGER CAN FEEL COMFORTABLE IN ELICITING PARENTAL AID WHEN NEEDED.

by RICHARD BAUMAN
Publ: CALIFORNIA HIGHWAY PATROLMAN V42 N3 P10-1, 38-9, 41 (MAY 1978)
1978
Availability: SEE PUBLICATION

HS-023 088

RVERS [RECREATION VEHICLE DRIVERS] ANTICIPATE ALTERNATE FUELS. PT. 1

ALTERNATIVE FUELS CAN BE DIVIDED INTO THOSE DERIVED MAINLY FROM THE BIOMASS, FROM FOSILIZED BIOMASS (COAL, OIL, NATURAL GAS), AND FROM WATER (HYDROGEN). FUELS IN THE NEAR FUTURE WILL COME PRINCIPALLY FROM COAL AND OIL SHALE. MANY METHODS EXIST FOR MAKING PIPELINE GAS FROM SOLID FUEL, SUCH AS THE HYGAS PROCESS. SOLID FUEL CAN BE CONVERTED TO LIQUID BY SUCH METHODS AS THE FISCHER TROPSCH PROCESS, DISCOVERED IN THE 1920'S, AND BY NEW METHODS. PRODUCTION OF "SYNCRUDE" BY PYROLYSIS OR COKING OF COAL IS ECONOMICALLY FEASIBLE DUE TO NEW TECHNIQUES. SYNCRUDE CAN BE EXTRACTED FROM SHALE OIL. PROBLEMS INCLUDE THE AVAILABILITY OF WATER, ENVIRONMENTAL DEGRADATION, AND HIGH COST OF MINING THE SHALE ROCK. TAR SANDS IN ALBERTA, CANADA, ARE VIEWED AS A PLENTIFUL SOURCE OF OIL, WITH PROBLEMS OF TRANSPORTATION TO THE REFINING PLANTS AND OIL EXTRACTION METHODS. FUEL FROM BIOMASS IS REGARDED AS A GOOD PROSPECT, SINCE BIOMASS IS CONSTANTLY RENEWABLE. SOME PLANT SPECIES (SUNFLOWERS) CAN BE HARVESTED SEVERAL TIMES A YEAR AND SOME (CATTAILS) CAN BE GROWN WHERE NO OTHER PLANT CAN SURVIVE. BIOMASS FROM THE SEA (KELP AND WATER HYACINTH) IS ANOTHER POTENTIAL SOURCE OF FUEL, AS IS GARBAGE, WHICH CAN BE CONVERTED INTO ALCOHOL. EXPERIMENTS ARE BEING MADE ON GASOLINE/ALCOHOL MIXTURES, "GASOHOL," USED EXTENSIVELY IN BRAZIL. ALCOHOL IS A POSSIBLE PRODUCT OF TOBACCO AND SUGAR CANE, WHICH SUFFER FROM DEPRESSED MARKETS. HYDROCARBONS CAN BE PRODUCED FROM GARDEN PLANTS. FUEL CAN ALSO BE OBTAINED FROM THE SOLAR ENERGY FIXATED IN ALGAE. WHEN ALGAE ARE DIGESTED BY BACTERIA, THE MAJOR PRODUCT IS METHANE. HYDROGEN CAN BE PRODUCED FROM OCEAN WATER BY ELECTROLYSIS AND TRANSMITTED BY PIPELINE, OR LIQUIFIED BY COMPRES-

SION AND COOLING. WATER VAPOR IS THE MAIN COMBUSTION PRODUCT OF HYDROGEN. IT IS RECOMMENDED THAT INCENTIVES BE ESTABLISHED FOR DEVELOPMENT OF ALTERNATIVE FUELS, THAT THESE FUELS BE EXEMPTED FROM PRICE CONTROLS, THAT THEY HAVE ACCELERATED DEPRECIATION, AND THAT THEY BE GIVEN INVESTMENT TAX CREDITS AND PARTIAL GRANTS TO SUPPORT CONSTRUCTION.

by ALAN TRATNER

Publ: TRAILER LIFE V38 N4 P8, 139, 141, 143-4, 147 (APR 1978)

1978

Availability: SEE PUBLICATION

HS-023 089

1978 DRIVER LICENSE ADMINISTRATION REQUIREMENTS AND FEES

TABULATED DATA FROM THE 50 STATES OF THE U.S., THE DISTRICT OF COLUMBIA, AND THE U.S. POSSESSIONS ARE PRESENTED COVERING DRIVER LICENSE ADMINISTRATION AND AGE REQUIREMENTS, DRIVER EXAMINATION AND TRAINING, RECIPROCITY, DRIVER LICENSE CONTENT, NON-DRIVER IDENTIFICATION CARDS, AND DRIVER LICENSE FEES. ALSO INCLUDED ARE DATA ON SUSPENSION, REVOCATION, AND REINSTATEMENT, AND FORMS OF APPLICANTS' NAMES ON THE DRIVER LICENSE. DATA ARE CURRENT AS OF 1 JAN 1978.

by ARLENE MUNDY

FEDERAL HWY. ADMINISTRATION, WASHINGTON, D.C. 20590

1978; 26P

DATA COLLECTED AND PRESENTED BY NHTSA AND AMERICAN ASSOC. OF MOTOR VEHICLE ADMINISTRATORS.

Availability: CORPORATE AUTHOR

HS-023 090

CHAIRMAN'S REPORT AND REPORT OF SUBGROUP 1. THE PEDESTRIAN'S ROAD ENVIRONMENT

THE TASKS OF THE SPECIAL RES. GROUP ARE REVIEWED, AS ARE THOSE OF THE THREE WORKING SUBGROUPS, WITH THEIR RECOMMENDATIONS ON SAFETY MEASURES AND RESEARCH AREAS, AND THE FUTURE PROGRAM OF THE GROUP. COMPLETE SEGREGATION OF PEDESTRIANS AND MOTOR VEHICLES IS RECOMMENDED BY URBAN PLANNING MEASURES ALLOWING FOR PEDESTRIAN AREAS AND STREETS, AND FOR SPECIFIC PEDESTRIAN ROUTES CONCENTRATED AND DIRECTED TO POINTS WHERE SUBWAYS AND BRIDGES CAN BE USED FOR CROSSING VEHICULAR TRAFFIC. PEDESTRIAN PRIORITY AREAS ARE RECOMMENDED, WHERE VEHICLE ACCESS IS LIMITED. A NEW APPROACH TO ROAD SAFETY IN RESIDENTIAL AREAS IS NEEDED, BASED ON INTEGRATION OF MIXED TRAFFIC BY SUCH SCHEMES AS THE RESIDENTIAL COURT OR YARD, WHERE THE SAME PAVED AREA CAN BE

USED FOR MOST ACTIVITIES (DRIVING, PLAYING, CYCLING, WALKING, AND PARKING) EXCEPT THROUGH TRAFFIC. THIS APPROACH IS NOT APPROPRIATE IN HIGH TRAFFIC AREAS OR THOSE OF HIGH ON-STREET PARKING VOLUME. PEDESTRIAN CROSSINGS, ON AND OFF GRADE, ARE REVIEWED, SUCH AS LIGHT-CONTROLLED AND ZEBRA CROSSINGS WHERE PARKING AND OVERTAKING BY VEHICLES IS PROHIBITED. HIGH USAGE RATES OF PEDESTRIAN CROSSINGS ARE RESPONSIBLE FOR THEIR GOOD SAFETY RECORDS. GUARD RAILS TO CHANNEL PEDESTRIAN TRAFFIC INTO THE CROSSINGS ARE SUGGESTED, AS IS THE NEED FOR PROPER ILLUMINATION OF THE CROSSINGS AT NIGHT. ANTISKID SURFACING AT CROSSINGS IS ALSO RECOMMENDED. SCHOOL CROSSINGS NEED SPECIAL ARRANGEMENTS, MAINLY TRAINED, RESPONSIBLE SUPERVISION. SPECIAL SPEED LIMITS NEAR SCHOOL CROSSINGS ARE RECOMMENDED. A DISTINCTION IS MADE BETWEEN TECHNICAL AND REGULATORY PEDESTRIAN SAFETY MEASURES. THE PROPER USE OF URBAN STREET FURNITURE AND THE INSTALLATION OF SAFETY ISLANDS ARE TECHNICAL MEASURES. TRAFFIC SPEED CAN BE CONTROLLED BY OBSTACLES AS WELL AS BY REGULATION. IN THE FIELD OF PEDESTRIAN SAFETY RESEARCH, COOPERATION WITH URBAN PLANNERS AND ENGINEERS IS ESSENTIAL. PILOT PROJECTS SHOULD BE UNDERTAKEN AND EVALUATED FOR PEDESTRIAN AND VEHICLE INTEGRATION. RESEARCH IS RECOMMENDED FOR DETERMINING PEDESTRIAN NEEDS IN URBAN AREAS, PARTICULARLY THE FACTORS WHICH DETERMINE PEDESTRIANS' CHOICE OF ROUTES. RESEARCH CAN DETERMINE PEDESTRIAN RISK AT DIFFERENT PARTS OF THE URBAN ROAD NETWORK AND CAN EVALUATE THE OPTIMAL AND ACCEPTABLE FEATURES OF MEASURES TO REDUCE VEHICLE SPEEDS IN PEDESTRIAN ZONES.

by H. TAYLOR

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT (OECD), SPECIAL RES. GROUP ON PEDESTRIAN SAFETY

1977; 78P REFS

CHAIRMAN'S REPORT ALSO IN FRENCH. SEE ALSO HS-023 091.

Availability: TRANSPORT AND ROAD RES. LAB., CROWTHORNE, BERKS., ENGLAND

HS-023 091

CHAIRMAN'S REPORT AND REPORT OF SUBGROUP 2. ROAD SAFETY EDUCATION

THE TASKS OF THE SPECIAL RES. GROUP ARE REVIEWED, AS ARE THOSE OF THE THREE WORKING SUBGROUPS, WITH THEIR RECOMMENDATIONS ON SAFETY MEASURES AND RESEARCH AREAS, AND THE FUTURE PROGRAM OF THE GROUP. FOUR PROPOSALS FOR PRACTICAL MEASURES WERE MADE BY SUBGROUP 2 THAT COULD BE RAPIDLY IMPLEMENTED FOR ROAD SAFETY EDUCATION WITH SPECIAL REFERENCE TO CHILDREN: INFORMATION CAMPAIGNS FOR PARENTS, REINFORCEMENT OF SAFETY EDUCATION BY PRACTICAL TRAINING EXERCISES IN TRAFFIC, TEACHER TRAINING IN ROAD SAFETY EDUCATION, AND SCHOOL CROSSING

October 31, 1978

HS-023 093

PATROLS INCLUDING CHILDREN AND ADULTS. RESEARCH RECOMMENDATIONS INCLUDE A MORE COMPREHENSIVE STATE-OF-THE-ART REPORT INCORPORATING ALL THE ASPECTS OF CHILDREN'S BEHAVIOR CHARACTERISTICS AND ROAD TRAFFIC TRAINING, AND COORDINATED STUDIES OF ASPECTS THAT REQUIRE FURTHER RESEARCH. A MORE COMPLETE LITERATURE SEARCH AND A COMPILATION OF CURRENT AND FUTURE RESEARCH PROJECTS ARE RECOMMENDED. FROM THE AVAILABLE STUDIES OF CHILDREN'S ACCIDENTS, ABILITIES, BEHAVIOR, AND EXPOSURE TO TRAFFIC, IT WAS CONCLUDED THAT CHILDREN DISPLAY POOR POWERS OF PERCEPTION, CONCENTRATION, ATTENTION, MEMORY, AND PHYSICAL AND EMOTIONAL CONTROL, POOR KNOWLEDGE AND UNDERSTANDING OF TRAFFIC, AND POOR BEHAVIOR PATTERNS IN THE TRAFFIC ENVIRONMENT. IT WAS ALSO CONCLUDED THAT PARENTAL SUPERVISION IS OFTEN INADEQUATE. IMPROVEMENT OF ROAD SAFETY INVOLVES NOT ONLY ADJUSTING THE CHILD TO HIS ENVIRONMENT, BUT ADJUSTING THE ENVIRONMENT TO THE CHILD, BY MEASURES RELATING TO THE LOCATION AND SURROUNDINGS OF SCHOOLS, BY PROVIDING SAFE PLAY AREAS, AND BY USE OF CONSPICUOUS CLOTHING IN DARK AREAS. MORE MUST BE KNOWN ABOUT THE DEVELOPMENT WITH AGE OF CHILDREN'S ABILITIES RELEVANT TO ROAD SAFETY, AND STANDARD TESTS DEVELOPED. RESEARCH IS NEEDED TO DETERMINE THE BEST MEDIA CONTENT AND METHODS OF PRESENTATION, BOTH FOR CHILDREN AND PARENTS. INTEGRATION OF POLICE, TEACHERS AND PARENTS IN ROAD SAFETY INSTRUCTION IS RECOMMENDED. PROGRAMS BY ROAD SAFETY ORGANIZATIONS SHOULD HAVE THE BENEFIT OF ROAD SAFETY RESEARCH AND SHOULD BE EVALUATED ON THE BASIS OF RESEARCH FINDINGS.

by H. TAYLOR
ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT (OECD), SPECIAL RES. GROUP ON PEDESTRIAN SAFETY
1978; 66P 84REFS
CHAIRMAN'S REPORT ALSO IN FRENCH. SEE ALSO HS-023 090.
Availability: TRANSPORT AND ROAD RES. LAB., CROWTHORNE, BERKS., ENGLAND

HS-023 092

INTERNATIONAL VEHICLE LEGISLATION--ORDER OR CHAOS? CONFERENCE PROCEEDINGS, LONDON, 22-23 OCTOBER 1974

THE CONFERENCE PROCEEDINGS INCLUDE THE AGENDA, DISCUSSION OF PAPERS AND THE PAPERS THEMSELVES, LIST OF DELEGATES, AN INDEX TO AUTHORS AND PARTICIPANTS, AND A SUBJECT INDEX. PAPERS DEAL WITH THE FOLLOWING TOPICS: DESIGN OF TRUCKS, BUSES, AND PASSENGER CARS IN CONFORMANCE WITH VARYING NATIONAL AND INTERNATIONAL STANDARDS; KEEPING INFORMED OF SUCH LEGISLATION; THE SPECIFIC STANDARDS IN JAPAN, WEST GERMANY, THE COMMON MARKET, AND THE UNITED KINGDOM; STANDARDS AS THEY RELATE TO AIR POLLUTION AND THE FUEL SHORTAGE; THE RESPONSIBILITY FOR

CONSUMER PROTECTION; AND THE BENEFITS, COSTS, AND PROBLEMS OF VEHICLE SAFETY LEGISLATION, INCLUDING LEGISLATIVE WARFARE VERSUS HARMONIZATION.

INSTITUTION OF MECHANICAL ENGINEERS, AUTOMOBILE DIV., LONDON, ENGLAND; SOCIETY OF MOTOR MANUFACTURERS AND TRADERS, LONDON, ENGLAND
Rept. No. CP19-1974; 1976; 172P REFS
INCLUDES HS-023 093--HS-023 110.
Availability: SAE

HS-023 093

TRUCK DESIGN FOR THE 'UN-COMMON' MARKET AND THE WORLD [LEGISLATION, STANDARDS]

THE DESIGN OF TRUCKS WITH RESPECT TO INTERNATIONAL LEGISLATION IS DISCUSSED. IT IS NOW VIRTUALLY IMPOSSIBLE TO MAKE ONE VEHICLE FOR THE WORLD. THE REQUIREMENTS FOR CERTAIN MARKETS ARE EITHER INCOMPATIBLE OR AT LEAST UNACCEPTABLE IN OTHERS. EVEN WITH RESPECT TO THE EUROPEAN ECONOMIC COMMUNITY (EEC), ONE VEHICLE COMPONENT MAY BE SUBJECT TO MANY DIFFERENT LEGAL REQUIREMENTS. RECENT EXPERIENCE WITH DEVELOPMENT OF THE BEDFORD TM TRUCK HAS EMPHASIZED THE PROLIFERATING EFFECT OF LEGISLATION DIFFERENCES, IN MODEL AVAILABILITY, COSTS, AND ENGINEERING EFFORT. STABILIZATION IN THE EEC IS AN ESSENTIAL FIRST STEP AND MUST INCLUDE CONSTRUCTION AND USE REGULATIONS, AND ALSO THE MORE SUBJECTIVE ASSESSMENTS ENCOUNTERED IN TYPE APPROVAL PROCEDURES, IN ADDITION TO THE MORE VISIBLE ENVIRONMENTAL AND SAFETY REQUIREMENTS. SPECIAL CONDITIONS REQUIRED IN WIDER MARKETS, INCLUDING AUSTRALIA, JAPAN, AND THE U.S., ALSO TEND TO CREATE SPECIALIZED PRODUCTS. INCLUSION OF LOCAL PURCHASE REGULATIONS AND IMPORT QUOTAS GENERATE DISSIMILARITIES WITH ATTENDANT IDENTIFICATION AND SERVICING PROBLEMS. IT IS NOW A NORMAL PART OF THE REGULATION-MAKING PROCESS IN EUROPE TO CONSULT WITH VEHICLE MANUFACTURERS. THERE CAN BE LITTLE DOUBT THAT SUCH A PROCESS IS GOOD, EVEN ALLOWING FOR THE FACT THAT IT CONSUMES A GREAT DEAL OF ENGINEERING TIME. THE EVOLUTION OF A LAW FROM DIALOGUES OF THIS KIND CAN RESULT IN A SATISFACTORY, PRACTICAL SOLUTION. IN THE CONTEXT OF THE COMMON MARKET THIS NATIONAL "SOLUTION" IS THEN REFINED BY A CONSENSUS OF OPINION AMONG THE MEMBER NATIONS. IN GENERAL, THE VEHICLE DESIGNER'S PLEA IS TO COORDINATE INTERNATIONAL LEGISLATION.

by W. B. LARSON
VAUXHALL MOTORS LTD., LUTON, BEDS., ENGLAND
Publ: HS-023 092 (CP19-1974), "INTERNATIONAL VEHICLE LEGISLATION--ORDER OR CHAOS?," LONDON, 1976 P4-6
1976
Availability: IN HS-023 092

HS-023 094

THE REGULATION BUS, OR LEGISLATION IN PSV DESIGN [PUBLIC SERVICE VEHICLE, UNITED KINGDOM]

THE MAIN LEGISLATIVE REQUIREMENTS AFFECTING PUBLIC SERVICE VEHICLES (PSV'S) IN THE UNITED KINGDOM ARE CURRENTLY SPLIT BETWEEN THE 1973 C AND U (CONSTRUCTION AND USE) REGULATIONS WHICH CONTAIN A NUMBER OF SPECIFIC ITEMS AFFECTING BUSES, AND THE SEPARATE AND ADDITIONAL PSV (CONDITIONS OF FITNESS, EQUIPMENT AND USE) REGULATIONS 1972. FURTHER CONSTRAINTS ON PSV DESIGN ARISE FROM CODES OF PRACTICE WHICH ARE OCCASIONALLY INTRODUCED TO SUPPLEMENT THE BASIC LEGISLATION AND CONTROL NEWLY DEVELOPING ASPECTS OF BUS MANUFACTURE OR OPERATION. THE STABILITY REQUIREMENTS, I.E. RESISTANCE TO OVERTURNING, FOR PSV'S HAVE ALWAYS BEEN AN IMPORTANT FACTOR IN DESIGN. THE ASSESSMENT OF COMPLIANCE IS MADE BY MEANS OF THE REQUIRED STATIC "TILT" TEST. WHILE VEHICLES PASSING THIS TEST HAVE EXCELLENT RECORDS WITH REGARD TO OVERTURNING, SO FAR AS IS KNOWN THERE HAS BEEN NO GENERAL PROBLEM WITH BUS INSTABILITY IN THE MANY COUNTRIES WHERE NO SPECIFIC RULES OR TESTS APPLY ON THIS SUBJECT. TURNING OR SWEPT CIRCLE REQUIREMENTS HAVE LONG FIGURED IN BRITISH PSV REGULATIONS. WHEN APPLIED TO NORMAL BEAM AXLES AND ORTHODOX STEERING LINKAGES THE CIRCLE REQUIREMENTS DEMAND INNER AND OUTER WHEEL LOCK ANGLES IN THE ORDER OF 46° AND 38°, RESPECTIVELY, WHICH IN TURN GENERALLY LEAD TO POOR ANGULAR RELATIONSHIPS BETWEEN TRACK ROD AND LEVERS. SOME OTHER TYPES OF STEERING LINKAGE AND FRONT AXLE OR WHEEL LOCATION ARRANGEMENTS ENABLE THESE HIGH LOCK ANGLES TO BE ACHIEVED MORE READILY BUT AT HIGHER COST AND COMPLICATION AND LOSS OF EVEN BASIC COMMONALITY WITH HIGH PRODUCTION VOLUME TRUCK UNITS. SECONDARY PROBLEMS ARISE FOR THE DESIGNER IN RECONCILING THE LARGE WHEEL BOX INTRUSIONS NECESSITATED BY LARGE LOCK ANGLES WITH THE NEED TO KEEP ROAD SPRING SEPARATION AS WIDE AS POSSIBLE FOR STABILITY, THE NEED TO MAINTAIN ADEQUATE GANGWAY BETWEEN BOXES, AND THE NEED TO OFFER OPERATORS THE LOWEST PRACTICABLE FLOOR HEIGHT. WITH RESPECT TO MAIN CONSTRUCTIONAL AND BODY LAYOUT DIMENSIONS, ADDITIONAL COMPLICATIONS EXIST FOR PSV DESIGN WITH RESPECT TO THE DETERMINATION OF WHEELBASE TO FRONT OVERHANG RELATIONSHIPS TO MEET TURNING CIRCLE REQUIREMENTS, DISPOSITION OF SEATED PASSENGERS AND STANDEE AREAS IN RELATION TO AXLE LOADS, FLOOR HEIGHT AND RATIO OF UPPER DECK TO LOWER DECK PASSENGER NUMBERS IN ACHIEVING SATISFACTORY DOUBLE-DECK STABILITY, ETC. AN ASPECT OF UK PSV LEGISLATION WHICH GIVES RISE TO CONCERN FROM TIME TO TIME IS THE DISCRETIONARY AND INTERPRETIVE AUTHORITY VESTED IN AREA MECHANICAL ENGINEERS AND CERTIFYING OFFICERS. A FORMAL TYPE APPROVAL DISCIPLINE FOR

PSV'S WOULD EFFECTIVELY ELIMINATE THIS SITUATION. CURRENTLY PSV'S, AS OTHER TYPES OF VEHICLES, ARE BEING AFFECTED ALSO BY A MULTITUDE OF RULES AND PROPOSALS ISSUING FROM THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION, ECONOMIC COMMISSION FOR EUROPE GROUPS OF RAPPORTEURS, THE EUROPEAN ECONOMIC COMMUNITY, ETC.

by B. J. COX
BRITISH LEYLAND UK LTD., TRUCK AND BUS DIV.,
LEYLAND, PRESTON, LANCs., ENGLAND
Publ: HS-023 092 (CP19-1974), "INTERNATIONAL
VEHICLE LEGISLATION--ORDER OR CHAOS?,"
LONDON, 1976 P7-16

1976
Availability: IN HS-023 092

HS-023 095

THE CONFLICT IN PASSENGER CAR LEGISLATION

CONFLICTS IN THE FIELD OF ENACTED AND FORMATIVE LEGISLATION ARE OF THE FOLLOWING TYPES: THE DESIRE FOR QUICK RESULTS IN TERMS OF INJURY REDUCTION WITH THE PROBABILITY THAT SIMPLE MEASURES WILL BE INEFFECTIVE; THE DESIRE FOR QUICK RESULTS IN TERMS OF THE FACILITATION OF INTERNATIONAL TRADE CONTRASTED WITH THE DIFFICULTY OF OBTAINING AGREEMENT AMONG INDEPENDENT NATIONS ON PRIORITIES AND METHODS; THE DESIRE OF INDEPENDENT NATIONS TO RETAIN ON THEIR STATUTE BOOKS ESTABLISHED MEASURES AND PROCEDURES CONTRASTED WITH THE NEED TO IDENTIFY REAL PROBLEMS IN A CHANGING SYSTEM OF TRAFFIC AND TRADE; AND AN OVERALL DESIRE THAT NONE OF THE PRECEDING OBJECTIVES SHALL BE ALLOWED TO INHIBIT PROGRESS IN SAFETY PERFORMANCE, ECONOMY OF RESOURCES, AND THE ALMOST UNIVERSAL DESIRE FOR A CONTINUED EXPANSION IN PERSONAL MOBILITY. SOME CONCLUSIONS REGARDING PASSENGER CAR LEGISLATION ARE MADE. FIRST, LEGISLATION MUST NOT INHIBIT DEVELOPMENT OF NEW FEATURES OF REAL WORTH NOR NEW SOLUTIONS TO REAL PROBLEMS; THERE ARE NO SIMPLE ANSWERS TO COMPLEX QUESTIONS. SECOND, PROBLEMS MUST BE IDENTIFIED; IF THE PROBLEM IS A SAFETY PROBLEM IT WILL REQUIRE ONE SOLUTION AND IF AN INTERNATIONAL ACCEPTANCE PROBLEM, MAYBE ANOTHER ONE. THIRD, SUBJECTIVE LEGISLATION WILL LEAD TO INCREASED COSTS AND VARYING STANDARDS. FOURTH, PERFORMANCE STANDARDS WHICH DO NOT FULLY SPECIFY THE REQUIREMENTS TO BE MET SHOULD BE CONFINED TO SPECIFIED HARDWARE; THEY SHOULD NOT LEAVE LOOPHOLES DUE TO AN INABILITY TO SPECIFY THE REQUIREMENTS. AND, FINALLY, AN IMPERFECT STANDARD WHICH IS ADOPTED AND TRIED IS BETTER THAN A PERFECT ONE WHICH IS NEVER ATTAINED.

by C. J. GOODE
ROVER-BRITISH LEYLAND UK LTD., LODE LANE,
SOLIHULL, WARWICK, ENGLAND
Publ: HS-023 092 (CP19-1974), "INTERNATIONAL
VEHICLE LEGISLATION--ORDER OR CHAOS?,"
LONDON, 1976 P17-27

1976; 4REFS
Availability: IN HS-023 092

HS-023 096

THE LEGISLATIVE MAZE [ORGANIZATIONS INVOLVED IN MOTOR VEHICLE LEGISLATION]

THREE MAIN PLANES OF INTEREST (INDUSTRIAL OR COMMERCIAL, GOVERNMENTAL, AND INDEPENDENT OR PUBLIC INTEREST GROUPS, RESEARCH ORGANIZATIONS, STANDARDS INSTITUTIONS, ETC.) ARE DISCUSSED IN TERMS OF THEIR OPERATION ON THREE LEVELS (NATIONAL, INTERNATIONAL, AND REGIONAL). THE OFTEN COMPLEX INTERRELATIONSHIPS, THE MODES OF OPERATION, THE SCOPE OF MEMBERSHIP AND, MOST SIGNIFICANTLY, THE DEGREE OF APPLICATION OF HARMONIZED OR UNIFORM LAWS AND THE STATE OF PROPOSALS TO DATE CONCERNING THESE ORGANIZATIONS ARE DISCUSSED. THE ORGANIZATIONS (AND THEIR CORRESPONDING COUNTRIES) AND THEIR THREE PLANE/THREE LEVEL AREAS OF INTERACTION ARE DEPICTED IN A DIAGRAM. ORGANIZATIONAL CHARTS ARE PROVIDED FOR THE UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE (ECE), GROUP OF EXPERTS ON VEHICLE CONSTRUCTION WP29; THE EUROPEAN ECONOMIC COMMUNITY (EEC); AND THE SOCIETY OF MOTOR MANUFACTURERS AND TRADERS (SMMT). TABLES LIST ORGANIZATIONS INVOLVED IN INTERNATIONAL RULEMAKING AND NATIONS REPRESENTED IN VARIOUS ORGANIZATIONS; PROVIDE A SUMMARY OF THE MAIN GENEVA (ECE) REGULATIONS, THEIR NEAREST BRUSSELS (EEC) DIRECTIVE EQUIVALENTS, THE RELEVANT ISO (INTERNATIONAL ORGANIZATION FOR STANDARDS) GROUPS, WHICH NATIONS "ACCEPT" OR "ADOPT" (MANDATE) THESE REQUIREMENTS AND AN INDICATION OF THE SIMILARITY TO SOME EXISTING UNIQUE NATIONAL LEGISLATIVE REQUIREMENTS; AND GIVE A SELECTION OF THE MAIN UPCOMING DRAFTS AND PROPOSALS FROM ECE AND EEC WITH THE APPROPRIATE ISO FACING GROUP. A GLOSSARY OF ACRONYMS FOR THE ORGANIZATIONS INVOLVED IN VEHICLE LEGISLATION IS ALSO PROVIDED.

by E. J. CUTTING; K. J. B. TEESDALE
FORD MOTOR CO. LTD.

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1976; 7REFS

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HS-023 097

THE STANDARDS CHALLENGE [MOTOR VEHICLE LEGISLATION]

OWING TO HISTORICAL CIRCUMSTANCES CERTAIN REQUIREMENTS FOR MOTOR VEHICLES ARE LAID DOWN BY INTERGOVERNMENTAL AUTHORITIES IN DIRECT CONSULTATION WITH INDUSTRY. THESE FORM THE STATUTORY REQUIREMENT IN EACH SIGNATORY COUNTRY, MAKING A NATIONAL STANDARD FOR THOSE PARTICULAR FEATURES REDUNDANT. NEVERTHELESS, EVEN THE ECONOMIC COMMISSION FOR EUROPE (ECE) WHICH HAS MADE THE EARLIEST PROGRESS IN INTERNATIONAL AGREEMENTS ON VEHICLE REQUIREMENTS, RECOGNIZES THE VALUE OF "REFERENCE TO STANDARDS" PRIN-

CIPLE. THE COMMISSION OF THE EUROPEAN ECONOMIC COMMUNITY (EEC) DRAWS ON THE WORK OF THE ECE WHERE APPROPRIATE IN PREPARING DRAFT DIRECTIVES FOR THE REMOVAL OF TECHNICAL BARRIERS TO TRADE. THE PROMULGATION OF DIRECTIVES AND THE ACCOMPANYING WITHDRAWAL OF ANY CORRESPONDING BRITISH STANDARDS, HOWEVER, IS BY NO MEANS THE SOUNDING OF A DEATH BELL FOR THE BRITISH STANDARDS. THERE WILL ALWAYS BE A PLACE FOR SUPPORTING TECHNICAL AGREEMENTS. THE INTERNATIONAL AGREEMENTS PROVIDE, IN MOST CASES, FOR TYPE APPROVAL WITH PROVISION FOR SUBSEQUENT SPOT CHECKS. AS AN EXAMPLE OF A GOOD SURVEILLANCE SYSTEM, THE KITEMARK SCHEME FOR CAR SEAT BELTS IS EXAMINED IN DETAIL. THE KITEMARK IS THE REGISTERED TRADEMARK OF THE BRITISH STANDARDS INSTITUTION (BSI), AND MANUFACTURERS ARE ALLOWED TO USE THIS MARK ON PRODUCTS MANUFACTURED UNDER A SCHEME OF SUPERVISION AND CONTROL WHICH ENSURES AN ACCEPTABLE LEVEL OF COMPLIANCE WITH THE APPROPRIATE BRITISH STANDARD. THE DEVELOPMENT OF INTERNATIONAL CERTIFICATION SYSTEMS IS BEING STUDIED BY THE INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO). FIRST, HOWEVER, THERE MUST BE SUITABLE INTERNATIONAL STANDARDS AS A BASIS FOR CERTIFICATION. HITHERTO, THERE HAS BEEN AN UNEVEN ACCEPTANCE OF ISO'S AND IEC'S (INTERNATIONAL ELECTROTECHNICAL COMMISSION) RECOMMENDATIONS. WITH THE CHANGE OF TITLE OF THESE DOCUMENTS TO "INTERNATIONAL STANDARD," HOWEVER, AND WITH AN INCREASING USE OF THE INTERNATIONAL TEXT AS IT STANDS, HARMONIZED CRITERIA ARE MUCH CLOSER AT HAND. ALSO NEEDED ARE COMMON RULES FOR OPERATING SCHEMES BY NONSTATUTORY BODIES. THE MOST PROMISING DIRECTION FOR IMMEDIATE DEVELOPMENT APPEARS TO BE MUTUAL RECOGNITION OF NATIONAL SCHEMES BASED ON HARMONIZED CRITERIA, ALONG THE LINES OF THE EUROPEAN ELECTRONIC COMPONENTS SCHEME WHICH IS NOW BEING EXTENDED WORLDWIDE UNDER THE AUSPICES OF IEC. THERE IS GREAT POTENTIAL IN USING THE NATIONAL AND INTERNATIONAL STANDARDIZATION NETWORK; IT IS UP TO THE DIRECTORS OF THESE ORGANIZATIONS TO TAKE UP THE CHALLENGE AND HARNESS THE EFFORT.

by G. B. FEILDEN

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1976

Availability: IN HS-023 092

HS-023 098

ADMINISTRATIVE REQUIREMENTS--THE JAPANESE LEGISLATIVE SCENE [MOTOR VEHICLE REGULATIONS]

IN 1951 JAPAN'S ROAD VEHICLES ACT WAS ESTABLISHED SETTING THE SAFETY STANDARDS

FOR THE STRUCTURE AND COMPONENTS OF VEHICLES. BASED ON THIS ACT, THE SAFETY REGULATIONS FOR ROAD VEHICLES WERE ESTABLISHED IN THE SAME YEAR TO ASSURE SAFETY AND TO PREVENT POLLUTION HAZARDS. SINCE THAT TIME AMENDMENTS HAVE BEEN MADE TO THE REGULATIONS ON 30 OCCASIONS. BECAUSE OF THE GREAT NUMBER OF MOTOR VEHICLE ACCIDENTS IN JAPAN INVOLVING PEDESTRIANS, THE REGULATIONS HAVE, FOR EXAMPLE, A PROVISION FOR THE ELIMINATION OF PROTRUSIONS ON VEHICLE EXTERIORS. THE COUNCIL FOR TRANSPORT TECHNIQUES HAS SUBMITTED A RECOMMENDATION TO THE MINISTER FOR TRANSPORT CONTAINING 63 ITEMS TO ACCOMPLISH THREE MAIN GOALS (REDUCE ACCIDENTS ARISING FROM STRUCTURAL AND FUNCTIONAL DEFECTS IN VEHICLES, REDUCE INJURIES TO OCCUPANTS, AND PREVENT DAMAGE BY FIRE); THESE ITEMS ARE TO BE ENFORCED OVER A FIVE-YEAR PERIOD WHICH BEGAN IN 1972. ALSO, A MOTOR VEHICLE ACCIDENT ANALYSIS COMMITTEE WAS ORGANIZED IN 1973 TO ANALYZE THE RELATIONSHIP OF TRAFFIC ACCIDENTS AND VEHICLE STRUCTURE. SINCE 1966 WITH REGULATIONS ON CARBON MONOXIDE, REGULATIONS TO CONTROL AIR POLLUTION HAVE BEEN STRENGTHENED IN STAGES. IN JUL 1970 A NEW RECOMMENDATION WAS SUBMITTED TO THE MINISTER FOR TRANSPORT BY THE COUNCIL FOR TRANSPORT TECHNIQUES WHICH COVERED REGULATIONS ON EMISSIONS OF NITRIC OXIDE, HYDROCARBON, CARBON MONOXIDE, AND OTHER POLLUTANTS. THE ENVIRONMENT AGENCY WAS ESTABLISHED IN 1971 TO COVER ALL ASPECTS OF ENVIRONMENTAL POLLUTION; WITH RESPECT TO MOTOR VEHICLES, THIS AGENCY DETERMINES PERMISSIBLE LEVELS FOR EMISSIONS AND NOISE, UPON WHICH THE MINISTRY OF TRANSPORT BASES ITS REGULATIONS. IN 1975 AND 1976, BASED ON RECOMMENDATIONS FROM THE CENTRAL POLLUTION MEASURE COUNCIL, STRICTER MOTOR VEHICLE EMISSION REGULATIONS WILL BE ENFORCED. OTHER MOTOR VEHICLE REGULATIONS REQUIRE SUBMITTAL OF APPLICATIONS BY MANUFACTURERS AND IMPORTERS TO THE MINISTER OF TRANSPORT IF THEY DESIRE TO BUILD/SELL NEW TYPES OF VEHICLES, PERIODIC MOTOR VEHICLE INSPECTION, AND REPORT OF VEHICLE DEFECTS BY MANUFACTURERS.

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JAPAN

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LONDON, 1976 P57-9
1976

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HS-023 099

ADMINISTRATIVE REQUIREMENTS--THE WEST GERMAN LEGISLATIVE SCENE [MOTOR VEHICLE REGULATIONS]

IN GERMANY THE FEDERAL MINISTRY OF TRANSPORT (BMV), ROAD TRAFFIC DEPT., IN COOPERATION WITH 11 STATE AUTHORITIES, IS RESPONSIBLE FOR ESTABLISHING REGULATIONS. THE TECHNICAL SER-

VICES AND CONTROL CENTERS (TUV), ACTING UNDER THE SUPERVISION OF STATE AUTHORITIES, ARE RESPONSIBLE FOR CARRYING OUT APPROVAL AND COMPLIANCE TESTS AND FOR ESTABLISHING TEST REPORTS. THE FEDERAL MOTOR TRANSPORT OFFICE (KRAFTFAHRT-BUNDESAMT KBA) IS RESPONSIBLE FOR ISSUING TYPE APPROVALS FOR VEHICLES AS WELL AS FOR VEHICLE PARTS AND EQUIPMENT ON THE BASIS OF THE ABOVE-MENTIONED TEST REPORTS AND IN COMPLIANCE WITH CURRENT ORDINANCES. THE RULEMAKING SYSTEM IN WEST GERMANY IS GOVERNED BY THE ROAD TRAFFIC ACT OF 1952 WHICH DELEGATES AUTHORITY TO THE FEDERAL MINISTER OF TRANSPORT TO ISSUE THE ORDINANCES NECESSARY FOR ROAD SAFETY AND ENVIRONMENTAL PROTECTION. THREE IMPORTANT ORDINANCES CONCERNING ROAD TRAFFIC AND ROAD VEHICLES HAVE BEEN ISSUED PURSUANT TO THE ROAD TRAFFIC ACT. THE ROAD TRAFFIC ORDINANCE PROVIDES RULES AND INSTRUCTIONS WHICH MUST BE OBSERVED IN TRAFFIC BY PEDESTRIANS, DRIVERS, CYCLISTS, HORSEMEN, ETC. THE ROAD TRAFFIC LICENSING ORDINANCE CONTAINS THE ADMINISTRATIVE AND TECHNICAL REQUIREMENTS WITH WHICH ROAD VEHICLES MUST COMPLY. THE VEHICLE PARTS ORDINANCE COMPRISES ALL DETAILS ON HOW AND WHERE CERTAIN APPOINTED VEHICLE PARTS AND EQUIPMENT MUST BE APPROVED BEFORE THEY CAN BE OFFERED FOR SALE AND USED. AT PRESENT THE WEST GERMAN SYSTEM IS IN A STATE OF TRANSITION FROM NATIONAL TO INTERNATIONAL REGULATIONS. WHILE THE ECE (ECONOMIC COMMISSION FOR EUROPE) SYSTEM SEEMS TO WORK SATISFACTORILY, IT WILL STILL BE A LONG TIME UNTIL A COMPLETE EUROPEAN TYPE APPROVAL CAN BE GRANTED. FOR A START, THE KBA HAS BEEN AUTHORIZED BY THE BMV TO APPLY PARTIAL EEC (EUROPEAN ECONOMIC COMMUNITY) CERTIFICATES DEALING WITH VEHICLE COMPONENTS. BEGINNING ON A SMALL SCALE, THE WORK WILL BE EXTENDED TO A CONSIDERABLE DEGREE IN THE NEAR FUTURE.

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APPROVAL, D-239 FLENSBURG, GERMANY
Publ: HS-023 092 (CP19-1974), "INTERNATIONAL
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1976
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HS-023 100

ADMINISTRATIVE REQUIREMENTS--THE COMMON MARKET LEGISLATIVE SCENE [MOTOR VEHICLE REGULATIONS]

THE DIFFERENT LEGAL REGULATIONS REGARDING MOTOR VEHICLES IN THE MEMBER COUNTRIES OF THE EUROPEAN ECONOMIC COMMUNITY (EEC) SERIOUSLY AFFECT TRADE IN VEHICLES, OBLIGING MANUFACTURERS TO PRODUCE THEIR VEHICLES IN DIFFERENT VERSIONS IN ORDER TO SATISFY THE REQUIREMENTS OF THE COUNTRIES FOR WHICH THEY ARE INTENDED. THE NEED TO DEFINE UNIFORM CONDITIONS FOR TYPE APPROVAL FOR

VEHICLES HAS BECOME PRESSING. THE EEC HAS APPLIED ITSELF TO THE ISSUE FOR SOME TIME AND BETWEEN 1969 AND 1973 HAS GIVEN PRIORITY TO THE ESTABLISHMENT OF AN AD HOC PROGRAM FOR THE REMOVAL OF "NONTARIFF" BARRIERS TO TRADE. IN APPLYING ARTICLE 100 OF THE TREATY OF ROME, THE COMMISSION OF THE EUROPEAN ECONOMIC COMMUNITY HAS TRANSMITTED MORE THAN 20 PROPOSALS FOR DIRECTIVES TO THE COUNCIL OF MINISTERS, OF WHICH 14 HAVE BEEN ADOPTED. ABOUT 20 PROPOSALS ARE STILL BEING STUDIED TO ARRIVE AT THE COMPLETE WORKING OF THE COMMUNITY TYPE APPROVAL PROCEDURE FOR MOTOR VEHICLES. THIS PROCEDURE CONSISTS IN THE APPROVAL BY AN AUTHORITY IN A MEMBER STATE OF THE PROTOTYPE OF THE VEHICLE AND OF ITS FITTINGS. ONCE THE TYPE APPROVAL HAS BEEN OBTAINED, THE MANUFACTURERS CAN PRODUCE AND SELL VEHICLES OF THIS TYPE IN QUANTITY WITHOUT ANY OTHER ADMINISTRATIVE CONTROL OR FORMALITY. THE PRINCIPAL OBJECTIVE OF THE EEC'S HARMONIZATION WORK IS TO HAVE ALL THE DIRECTIVES NECESSARY TO ACHIEVE THIS END ADOPTED BY THE COMMUNITY.

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HS-023 101

ADMINISTRATIVE REQUIREMENTS--U.K. LEGISLATIVE SCENE [MOTOR VEHICLE REGULATIONS, UNITED KINGDOM]

THE DEVELOPMENT OF VEHICLE CONSTRUCTION AND USE AND ALLIED UNITED KINGDOM REGULATIONS, INCLUDING SPECIAL REQUIREMENTS FOR BUSES, SPECIAL-TYPE VEHICLES, ETC., IS OUTLINED. THERE HAS BEEN A GROWING AWARENESS OF THE NEED FOR HARMONIZATION OF TECHNICAL REGULATIONS BECAUSE OF THE INCREASED EXPORT OF VEHICLES, THE GROWING NUMBER AND COMPLEXITY OF SAFETY AND ENVIRONMENTAL REGULATIONS, AND THE DIFFICULTIES FACING MANUFACTURERS IN MEETING DIFFERENT PERFORMANCE AND LEGAL REQUIREMENTS. THERE HAS BEEN A CHANGE OF EMPHASIS FROM NATIONAL TO INTERNATIONAL REGULATIONS AND FROM "USE" TO "CONSTRUCTION" REQUIREMENTS VIA THE DEVELOPMENT OF ECONOMIC COMMISSION FOR EUROPE REGULATIONS AND EUROPEAN ECONOMIC COMMUNITY DIRECTIVES AND VEHICLE AND COMPONENT TYPE APPROVAL AND PRODUCTION CONFORMITY.

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HS-023 102

HISTORY IS NOT BUNK [EARLY BRITISH MOTOR VEHICLE LEGISLATION]

NINETEENTH CENTURY BRITISH MOTOR VEHICLE LEGISLATION, THE TURNPIKE ACTS, THE LOCOMOTIVES ON HIGHWAY ACTS OF 1865, 1878, AND 1896, AND THE MOTOR CAR ACT 1903 ARE TRACED TO INDICATE THEIR EFFECTS ON THE DEVELOPMENT, CONSTRUCTION, AND USE OF MECHANICAL VEHICLES. THE EFFECT OF PARTICULAR "CONSTRUCTION AND USE" REGULATIONS IS SHOWN; I.E. THE 1896 REGULATIONS EFFECTIVELY PREVENTED THE USE OF ANTISKID TREADS ON PNEUMATIC TIRES. THE INSISTENCE ON TWO INDEPENDENT BRAKING SYSTEMS HAS AFFECTED THE INTRODUCTION OF FOUR-WHEELED BRAKES, AS DID THE "HORSEPOWER TAX" AND ENGINE DESIGN. LEGISLATION HAS, AND STILL DOES, HAMPER TECHNICAL PROGRESS. SPECIFIC EXAMPLES ARE CITED, PARTICULARLY IN RELATION TO "SAFETY." FOR EXAMPLE, AN EARLY LONDON TAXI CAB COLLISION WAS BLAMED ON A RAIN-OBSCURED WINDSHIELD. THE LICENSING AUTHORITY THEN FORBODE FULL-HEIGHT WINDSHIELDS ON LONDON TAXIS FOR THE NEXT 30 YEARS. HAD THE LICENSING AUTHORITY DECREED THAT MEANS MUST BE PROVIDED TO KEEP WINDSHIELDS CLEAR, THE MECHANICAL WIPER WOULD HAVE BEEN INVENTED 20 YEARS BEFORE ITS ACTUAL DATE. PARALLELS ARE DRAWN, WHERE APPROPRIATE, BETWEEN SOME PAST BRITISH LEGISLATION AND PRESENT OR PENDING EUROPEAN ECONOMIC COMMUNITY RULES.

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HS-023 103

THE CAR, THE LAW AND THE CONSUMER; THE BOUNDARIES OF RESPONSIBILITY [GREAT BRITAIN]

EXISTING BRITISH STANDARDS PROCEDURES ARE INADEQUATE AND MISLEADING, WITH TOO GREAT A BIAS ON INDUSTRIAL CONSIDERATIONS. THERE IS A NEED FOR BUYERS AND USERS OF MOTOR VEHICLES, BEING FOR THE MOST PART UNQUALIFIED IN VEHICLE TECHNOLOGY AND LEGISLATION, TO HAVE RECOGNIZABLE AND PROTECTIVE STANDARDS TO GUIDE THEIR PURCHASING DECISIONS AND ENSURE THEIR HEALTH AND SAFETY. THESE STANDARDS, TO BE EFFECTIVE, MUST BE ENFORCEABLE BY LEGISLATION ON MANUFACTURERS AND ON SELLERS. SHORTCOMINGS IN GARAGE WORKSHOP STANDARDS, AND THE GROWTH OF DO-IT-YOURSELF VEHICLE MAINTENANCE AND REPAIR, MUST BE COUNTERED BY MORE ACTIVE GOVERNMENT PARTICIPATION IN THE ISOLATION OF DEFECTS AND THEIR RECTIFICATION. VEHICLE MODIFICATIONS AND RECALLS NEED TO BE GIVEN WIDER PUBLICITY. FINALLY, VEHICLES MUST BE

SUBJECTED TO STRICTER MAINTENANCE AND SAFETY CHECKS, AND THE COST OF THIS MUST BE BORNE PRINCIPALLY BY THE CONSUMER.

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HS-023 104

LEGISLATION: HARMONIZATION OR LEGISLATIVE WARFARE [MOTOR VEHICLE REGULATIONS]

SOME OF THE PROBLEMS WHICH FACE HOMOLOGATION ENGINEERS PRIOR TO, DURING AND AFTER SUBMISSION OF MOTOR VEHICLES TO GOVERNMENTAL AGENCIES IN ORDER TO SECURE HOMOLOGATION ARE REVIEWED. CONFUSION EXISTS TODAY IN MEMBER COUNTRIES OF THE EUROPEAN ECONOMIC COMMUNITY (EEC) WITH RESPECT TO MOTOR VEHICLE STANDARDS/REGULATIONS. SOME COUNTRIES DECIDED TO ISSUE CERTAIN ECE (ECONOMIC COMMISSION FOR EUROPE) REGULATIONS OR EEC DIRECTIVES WHILE OTHERS DID NOT AND RETAINED THEIR LOCAL REQUIREMENTS AND EVEN ENACTED NEW ONES. STRONG ACTION IS NEEDED BY THE UNITED NATIONS, THE BUREAU PERMANENT INTERNATIONALE DES CONSTRUCTEURS D'AUTOMOBILES (BPICA), AND ALL TRADE ASSOCIATIONS TO HARMONIZE MOTOR VEHICLE REGULATIONS. THE EEC MEMBERS SHOULD SHOW THE WAY BY ENFORCING THE TYPE APPROVAL SCHEME AS DEFINED IN DIRECTIVE 70/156 PUBLISHED IN FEB 1970 WHICH WOULD ENABLE MANUFACTURERS TO INTRODUCE THEIR VEHICLES IN THE COMMUNITY WITHOUT CHAOS AND EXCESSIVE COST. ALSO, ALL GOVERNMENTS SHOULD BE CONVINCED TO ACCEPT ONCE AND FOR ALL THE ECE REGULATIONS WHICH HAVE BEEN APPROVED BY TRADE ASSOCIATIONS AND MANUFACTURERS. FINALLY, ALL LOCAL APPROVAL SCHEMES REQUIRING SPECIFIC APPROVAL MARKS WHEN THE SAME ITEMS ALREADY SHOW "E" MARKS SHOULD BE ELIMINATED, AS SHOULD SUBJECTIVE WORDING IN REGULATIONS.

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Publ: HS-023 092 (CP19-1974), "INTERNATIONAL
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HS-023 105

AIR POLLUTION CONTROL STRATEGIES [AUTOMOTIVE EMISSIONS]

THE TWO TYPES OF MATHEMATICAL MODELS WHICH ARE USED IN THE U.S. FOR SETTING LIMITS

ON AUTOMOTIVE EMISSIONS ARE DISCUSSED. ROLL-BACK MODELS ARE USED TO SET LIMITS ON INDIVIDUAL VEHICLES AND MULTIPLE-SOURCE URBAN DIFFUSION MODELS ARE USED TO RELATE AREA AND LINE SOURCES OF VEHICULAR TRAFFIC TO NATIONAL AIR QUALITY STANDARDS FOR CARBON MONOXIDE, HYDROCARBONS, AND NITROGEN OXIDES. THERE HAVE BEEN SOME PROBLEMS WITH THESE APPROACHES, SOME STEMMING FROM RECENT APPRECIATION OF THE ENERGY SITUATION, WHICH HAVE RESULTED IN MOVES TO DEFER THE DATE OF APPLICATION OF THE LIMITS ON INDIVIDUAL VEHICLES AND OF TRANSPORTATION CONTROLS HERETOFORE LEGALLY REQUIRED.

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EPA-R-800901
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HS-023 106

AIR POLLUTION IN EUROPE AND THE FUEL SHORTAGE

THE DEVELOPMENT OF VEHICLE EMISSION CONTROL REGULATIONS IN EUROPE AND THE U.S. IS OUTLINED AND CONTRASTED. THE COST (EQUIPMENT, FUEL, MAINTENANCE) OF THE SEVERE STANDARDS PROPOSED FOR GASOLINE ENGINES IN THE U.S. IS GIVEN, AND IT IS SHOWN THAT IN EUROPE SIGNIFICANT REDUCTIONS IN CARBON MONOXIDE AND HYDROCARBONS HAVE BEEN ACHIEVED AT MINIMAL COST. IN THE LIGHT OF PRESENT KNOWLEDGE, THERE IS NO JUSTIFICATION FOR INTRODUCING SUCH STRINGENT CONTROLS IN EUROPE WHERE CLIMATIC CONDITIONS ARE QUITE DIFFERENT FROM THOSE IN CALIFORNIA AND WHERE CARS ARE SMALLER AND FEWER. CURRENT AND PROPOSED EUROPEAN GASOLINE LEAD LEGISLATION IS OUTLINED, AND THE EFFECT ON ENERGY AVAILABILITY AND THE HIGH COST IT WOULD INCUR, WITHOUT PRODUCING ANY MEASURABLE BENEFIT, ARE DETAILED. REDUCING GASOLINE LEAD CONTENT IS NOT THE ONLY MEANS OF REDUCING LEAD EMISSIONS FROM VEHICLES; THE LEAD CAN BE ALTERNATIVELY TRAPPED OR FILTERED IN THE EXHAUST, AND MEANS OF DOING THIS HAVE BEEN DEVELOPED. THESE ALTERNATIVE METHODS WOULD ENABLE GASOLINE DEMAND TO BE MET MORE EASILY WITHOUT INCURRING THE COST OF ADDITIONAL CRUDE OR NAPHTHA IMPORTS OR OF ADDITIONAL REFINING FACILITIES. WITH RESPECT TO CONSIDERING SEVERE AUTOMOTIVE EMISSION CONTROL REGULATIONS FOR EUROPE, SCIENTIFIC AND MEDICAL GUIDELINES SHOULD BE ESTABLISHED TO DISTINGUISH BETWEEN WHAT MAY BE ONLY AN OCCA-

SIONAL NUISANCE AND WHAT IS, IN ANY SENSE, A HEALTH HAZARD.

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ENGLAND; BP MARKETING LTD., P.O. BOX 148,
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ENGLAND

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HS-023 107

THE BENEFITS TO THE PUBLIC OF VEHICLE LEGISLATION--MEASURING THE UNMEASURABLE [GREAT BRITAIN]

MOTOR VEHICLE LEGISLATION IMPLEMENTED TO REDUCE "ANNOYANCE" TO THE PUBLIC AND HAZARDS TO "LIFE AND LIMB," WITH PARTICULAR REFERENCE TO GREAT BRITAIN, IS DISCUSSED. ALTHOUGH INEVITABLY THERE ARE GREY AREAS, A DISTINCTION MAY BE DRAWN BETWEEN ENVIRONMENTAL DISBENEFITS WHICH CAUSE "ANNOYANCE" AND THOSE WHICH ENDANGER "LIFE AND LIMB." LEGISLATION IMPLEMENTED TO REDUCE EITHER CATEGORY WILL INEVITABLY GENERATE COSTS, IN THE ABSENCE OF SUBSIDY VIA GOVERNMENT FROM THE GENERAL TAXPAYER; SINCE DEMAND FOR TRANSPORTATION IS HIGHLY INELASTIC, IT IS THE CONSUMER WHO USUALLY FOOTS THE BILL. IN EVALUATING LEGISLATION RELATING TO ENVIRONMENTAL NUISANCE, ATTEMPTS SHOULD BE MADE TO MEASURE CAREFULLY THE BENEFITS TO THE PUBLIC AS WELL AS COSTS. UNFORTUNATELY THE TECHNIQUES AVAILABLE FOR MEASURING SUCH BENEFITS AS "PEACE AND QUIET," INDIVIDUAL PRIVACY, ETC., ARE VERY INADEQUATE, AND AS YET THERE IS NO CONSENSUS ABOUT THEIR VALUE. IN THIS AREA CHAOS SEEMS TO BE A MORE ACCURATE DESCRIPTION THAN IS ORDER. THE SAME PROBLEM SHOULD NOT ARISE FOR VEHICLE LEGISLATION AFFECTING "LIFE AND LIMB" IF IT IS EVALUATED ON A COST-EFFECTIVENESS BASIS.

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COST OF VEHICLE LEGISLATION TO THE USER

THE FOLLOWING FOUR KINDS OF VEHICLE LEGISLATION INCREASE THE COST OF THE CAR: LEGISLATION DUE TO THE CUSTOM OF THE

COUNTRY (I.E. LEFT OR RIGHT HAND DRIVE, WHITE OR YELLOW LIGHTS), NOISE REGULATIONS, POLLUTION CONTROL, AND SAFETY REGULATIONS. THE SAME MODEL HAS TO BE CHOSEN BY DIFFERENT KINDS OF CUSTOMERS IN DIFFERENT MARKETS. THUS A NEW MODEL HAS TO SATISFY THE NEEDS AND THE REGULATIONS OF DIFFERENT MARKETS. FOR A FRENCH MANUFACTURER A NEW MODEL HAS TO BE SOLD SIMULTANEOUSLY, FOR EXAMPLE, IN FRANCE, ENGLAND, JAPAN, AND THE U.S. IN A GIVEN COUNTRY THE LEGISLATION DUE TO CUSTOM IS THE FIRST PROBLEM WHICH HAS TO BE SOLVED, THEN ALL THE TECHNICAL REGULATIONS (NOISE, POLLUTION, SAFETY) HAVE TO BE OBSERVED. THE PROBLEM IS COMPLICATED BY THE FACT THAT THE DIFFERENT CAR COMPONENTS ARE NOT DESIGNED AT THE SAME TIME AND THE NEW MODEL USES AN EXISTING ENGINE, GEARBOX AND OTHER IMPORTANT COMPONENTS. THUS IT BECOMES NECESSARY FOR THE AUTO MANUFACTURER TO ANTICIPATE THE PROBABLE EVOLUTION OF THE REGULATIONS IF THE LIFE OF A NEW MODEL IS ACCEPTED TO BE AT LEAST SEVEN TO TEN YEARS. NOISE, POLLUTION, AND SAFETY REGULATIONS REQUIRE SOLUTIONS WHICH DECREASE THE GENERAL LEVEL OF PERFORMANCE AND POWER AND INCREASE THE LEVEL OF WEIGHT. THESE SOLUTIONS HAVE DIRECT COST. BUT HAVING COMPLIED WITH THE REGULATIONS, THE PERFORMANCE OF THE CAR MAY BE NO LONGER SATISFACTORY AND THE MANUFACTURER HAS TO LOOK FOR NEW SOLUTIONS TO RE-OBTAIN THE DESIRED LEVEL OF CHARACTERISTICS. THE DESIRED PERFORMANCE CAN BE RE-OBTAINED BY INCREASING THE ENGINE DISPLACEMENT AND ACCEPTING ALL THE CONSEQUENCES ON THE FRONT PART OF THE CAR. THIS IS CALLED THE INDIRECT COST OF THE LEGISLATION. THE COST OF THE REGULATIONS INCLUDED IN THE PRICE OF THE CAR IS THEN THE RESULT OF THE COMBINATION OF DIRECT AND INDIRECT COSTS. WHEN BOUGHT, THE CAR IS CHARACTERIZED BY ITS COST OF USE; FOR EXAMPLE, THE FUEL CONSUMPTION AND COST OF MAINTENANCE OF A CAR WITH A POLLUTION CONTROL DEVICE IS GREATER THAN THAT OF THE ORIGINAL CAR. THE COMPLETE COST OF REGULATIONS IS THE TOTAL OF DIRECT AND INDIRECT COSTS AND THE COST OF USE.

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HS-023 109

PROBLEMS IN VEHICLE SAFETY LEGISLATION

ROAD ACCIDENTS CAN BE VIEWED IN EPIDEMIOLOGICAL TERMS; SOME OF THE SALIENT FEATURES OF TRAFFIC INJURIES ARE OUTLINED, AND PARALLELS ARE DRAWN BETWEEN VEHICLE SAFETY LEGISLATION AND OTHER PUBLIC HEALTH MEASURES. EXAMPLES OF EFFECTIVE LEGISLATION

ARE GIVEN BY QUOTING EVIDENCE ON SEAT BELTS, ANTIBURST DOOR LOCKS AND WINDSHIELD GLASS; AND EXAMPLES OF QUESTIONABLE LEGISLATION (E.G. HEAD RESTRAINTS AND ENERGY-ABSORBING STEERING ASSEMBLIES) ARE PROVIDED. FROM THESE EXAMPLES A CASE IS PUT FORWARD FOR THE GREATER INTEGRATION OF RESEARCH INTO THE LEGISLATIVE PROCESS. RESEARCH WILL HELP IN THE IDENTIFICATION OF HIGH RISK SITUATIONS, IN THE PREDICTION OF THE EFFECTS OF POSSIBLE LEGISLATION, AND IN MONITORING THE INTRODUCTION OF NEW REQUIREMENTS. THERE IS A TREND IN SAFETY LEGISLATION AWAY FROM DESIGN STANDARDS AND TOWARD PERFORMANCE CRITERIA, ALTHOUGH THERE ARE SOME DIFFICULTIES STEMMING FROM THIS TREND IN TERMS OF SPECIFYING THE REQUIREMENTS FOR VEHICLE OCCUPANT PROTECTION. THE VARIOUS REQUIREMENTS FOR OCCUPANT PROTECTION IN FRONTAL AND SIDE IMPACTS ARE SUMMARIZED, AND CONTRASTED WITH THE NEEDS FOR PEDESTRIAN PROTECTION AND THE REDUCTION OF VEHICLE DAMAGE IN LOW SPEED IMPACTS.

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ADMINISTRATIVE REQUIREMENTS--THE U.S. LEGISLATIVE SCENE [MOTOR VEHICLE REGULATIONS]

FEDERAL REGULATION OF NEW MOTOR VEHICLES IN THE U.S. IS DIVIDED BETWEEN THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION (NHTSA) WHICH ISSUES SAFETY AND PROPERTY DAMAGE REDUCTION STANDARDS AND THE ENVIRONMENTAL PROTECTION AGENCY (EPA) WHICH ISSUES EMISSION AND NOISE STANDARDS. ALL STANDARDS MUST BE OBJECTIVE, PRACTICABLE, AND PERFORMANCE-ORIENTED. SELECTION OF SAFETY AND NOISE STANDARDS IS LARGELY COMMITTED TO AGENCY DISCRETION. THERE IS LITTLE DISCRETION, HOWEVER, IN THE SELECTION OF DAMAGEABILITY STANDARDS AND EVEN LESS REGARDING EMISSION STANDARDS. THE STANDARDS ARE ESTABLISHED THROUGH INFORMAL RULEMAKING PROCEDURES. THE FIRST PUBLIC STEP IS USUALLY THE PUBLICATION OF THE TEXT AND RATIONALE OF A PROPOSED STANDARD AND AN INVITATION FOR PUBLIC COMMENTS. AFTER AGENCY ANALYSIS OF THE COMMENTS AND OTHER AVAILABLE DATA, THE STANDARD IS ISSUED (OR NOT). COMPLIANCE WITH THE SAFETY AND DAMAGEABILITY STANDARDS IS CERTIFIED BY MANUFACTURERS THEMSELVES, WHILE COMPLIANCE WITH THE EMISSION STANDARDS IS CERTIFIED BY THE GOVERNMENT. EACH MANUFACTURER IS SUBJECT TO CIVIL PENALTIES FOR NONCOMPLIANCE WITH A SAFETY OR DAMAGEABILITY STANDARD UNLESS IT CAN BE

DEMONSTRATED THAT DUE CARE WAS EXERCISED AND THAT THERE WAS AN UNAWARENESS OF NON-COMPLIANCE. CIVIL PENALTIES MAY ALSO BE ASSESSED FOR THE SALE OF VEHICLES NOT COVERED BY A CERTIFICATE OF CONFORMITY WITH THE EMISSION STANDARDS. CRIMINAL, RATHER THAN CIVIL, PENALTIES ARE PROVIDED FOR VIOLATION OF THE NOISE STANDARDS.

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HS-023 111

WHAT'S THE CURRENT STATUS OF CAR AIR BAGS?

VARIOUS ATTITUDES REGARDING MANDATORY PASSIVE RESTRAINT SYSTEMS IN AUTOMOBILES (AIR BAGS AND PASSIVE BELTS) ARE REPORTED. MOST INSURANCE FIRMS FAVOR AIR BAGS; THE STRONGEST LOBBYIST IS ALLSTATE WHICH ESTIMATES THAT PASSIVE RESTRAINT SYSTEMS CAN RESULT IN AN AVERAGE ANNUAL SAVINGS OF AT LEAST \$33 PER INSURED CAR BECAUSE OF FEWER DEATHS AND INJURIES. A RECENT GALLUP POLL SHOWED THAT YOUNG ADULTS FROM 18 TO 29 YEARS OF AGE ARE STRONGEST IN THEIR SUPPORT OF AIRBAG USE. WOMEN OF ALL AGES SUPPORT THE AIRBAG PLAN BY THE SUBSTANTIAL MARGIN OF 51% TO 27%; MEN VOTED AGAINST IT BY A 47% TO 42% MARGIN. CALSPAN CORP., ONE OF THE MOST ACTIVE RESEARCHERS OF AIR BAGS, HAS GENERALLY FOUND THE AIR BAGS TO PERFORM WELL. OPPONENTS OF THE AIR BAGS ARGUE THAT THE SYSTEMS ARE UNPROVEN, THAT THEY CONSTITUTE NEEDLESS FEDERAL MEDDLING, AND THAT THEY WILL HIKE CONSUMER COSTS AND INCREASE GAS CONSUMPTION. WHILE LAUDING THE CONCEPT OF AIR BAGS, THE AMERICAN AUTOMOBILE ASSOCIATION HAS BEEN A VOCAL OPPONENT OF THEIR MANDATORY INSTALLATION. DETROIT AUTO FIRMS ARE AGAINST AIR BAGS BECAUSE OF THE COSTS INVOLVED, BUT THEY FAVOR MANDATORY SAFETYBELT USAGE LAWS. DESPITE ITS OPPOSITION, GENERAL MOTORS (GM) IS WILLING TO OFFER AIR BAGS AND AUTOMATIC SEATBELT SYSTEMS, BUT AS AN "OPTION." GM'S VOLUNTARY DEMONSTRATION PROGRAM WILL INCLUDE TWO NEWLY DESIGNED PASSIVE RESTRAINT SYSTEMS. AN AUTOMATIC BELT SYSTEM WILL BE OFFERED AS AN OPTION ON THREE REPRESENTATIVE CAR LINES STARTING WITH THE 1979 MODEL YEAR, OR EARLIER IF POSSIBLE. AIR CUSHION RESTRAINTS WILL BE OFFERED AS AN OPTION TO BUYERS OF ALL FULL-SIZED CARS STARTING WITH THE 1981 MODEL, ONE YEAR IN ADVANCE OF THE FEDERAL REQUIREMENT. IF FORD MOTOR CO.'S ENGINEERING PLANS ARE SUCCESSFUL, A PASSIVE BELT SYSTEM WILL BE OFFERED AS A CUSTOMER OPTION ON AT LEAST ONE MID-SIZED CAR LINE IN 1980. IN MODEL YEAR 1981, AIR BAGS WILL BE AN OPTION ON AT LEAST

October 31, 1978

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ONE OF ITS FULL-SIZED CAR LINES. ALSO, IN MODEL YEAR 1981, FORD PLANS TO OFFER THE PASSIVE BELT AS AN OPTION ON A SUBCOMPACT VEHICLE.

by ED JANICKI

Publ: CALIFORNIA HIGHWAY PATROLMAN V42 N3 P14-6, 46, 48, 50-1, 58-60 (MAY 1978)

1978

Availability: SEE PUBLICATION

HS-023 112

OCCUPANT PROTECTION: AN INTEGRATED APPROACH

THEORETICAL AND EMPIRICAL STUDIES BY VOLKSWAGEN ENGINEERS TO INVESTIGATE THE COMPLEX INTERACTIONS OF VEHICLE STRUCTURES AND PASSENGER RESTRAINT SYSTEMS IN ORDER TO OPTIMIZE SMALL-CAR OCCUPANT PROTECTION ARE REPORTED. THE FRONTAL IMPACT STUDIES SHOW THE IMPORTANCE OF A BALANCE BETWEEN STRUCTURAL DEFORMATION AND INTEGRITY, AND OF RESTRAINT DEVICES THAT PRELOAD AND LIMIT FORCES ON THE OCCUPANTS. THE INVESTIGATIONS FOCUS ON SEATBELT SYSTEMS, PARTICULARLY VW'S PASSIVE RESTRAINT CONCEPT. FOUR DIFFERENT RESTRAINT CONFIGURATIONS WERE STUDIED. ONE WAS AN ACTIVE THREE-POINT BELT; THE OTHER THREE, VARIATIONS ON A PASSIVE SHOULDER BELT/KNEE-BOLSTER THEME. THE THREE-POINT SYSTEM WAS FITTED WITH BOTH A PRELOADING DEVICE AND A BELT FORCE LIMITER. PASSIVE SYSTEMS WERE TESTED IN THREE FORMS, WITH LIMITER AND PRELOADER, WITH LIMITER ALONE, AND WITH NEITHER DEVICE. PARAMETERS MODELED IN THE THEORETICAL WORK INCLUDED PASSENGER COMPARTMENT ACCELERATION, OCCUPANT ACCELERATION, AND REACTION TIME OF THE RESTRAINT SYSTEM MEASURED FROM THE ONSET OF COMPARTMENT ACCELERATION. TWO SERIES OF SLED TESTS USING A 50TH PERCENTILE MALE DUMMY IN A FRONT PASSENGER POSITION WERE RUN. THE FIRST COMPARED SHOULDER BELT/KNEE BOLSTER COMBINATIONS IN THE THREE DIFFERENT FORMS. THESE TESTS SIMULATED 50 KM/H IMPACTS AGAINST A FIXED BARRIER; SLED DECELERATIONS WERE AROUND 25 G. THE SECOND SERIES COMPARED AN ACTIVE THREE-POINT BELT WITH THE PASSIVE RESTRAINT; BOTH SYSTEMS HAD FORCE LIMITER AND PRELOADER. SIMULATED IMPACT SPEEDS WERE 64 KM/H WITH SLED DECELERATIONS OF AROUND 27 G. RESULTS CONFIRM WHAT IS PERCEIVED AS ONE OF THE PRINCIPAL ADVANTAGES OF THE BELT/BOLSTER SYSTEM, I.E., KINEMATICS THAT SUBSTITUTE SOME FORWARD MOVEMENT OF THE LOWER TORSO IN PLACE OF POTENTIALLY MORE HAZARDOUS HEAD DISPLACEMENT. ALSO, THE BENEFICIAL INFLUENCES OF FORCE LIMITING AND PRELOADING ARE SHOWN. AN EVALUATION INDEX, EI, DESIGNED TO HELP QUANTIFICATION OF THE MANY VARIABLES INFLUENCING OCCUPANT PROTECTION IS PRESENTED AND DISCUSSED. GIVEN EQUIVALENT TEST CONDITIONS, THE EI CAN BE USED TO EVALUATE VARIATIONS ON A GIVEN

RESTRAINT THEME, OR IT CAN BE USED TO COMPARE ONE SYSTEM TYPE WITH ANOTHER.

Publ: AUTOMOTIVE ENGINEERING V86 N5 P26-31 (MAY 1978)

1978; 3REFS

BASED ON SAE-780282 "PASSIVE VEHICLE SAFETY AS CARS GROW SMALLER," BY H. SCHIMKAT AND R. WEISSNER, AND SAE-780414 "A COMPARISON OF ADVANCED BELT SYSTEMS REGARDING THEIR EFFECTIVENESS," BY R. WEISSNER; PRESENTED AT SAE CONGRESS, DETROIT, 27 FEB-3 MAR 1978.

Availability: SEE PUBLICATION

HS-023 113

LEAN-SIDE NOX [NITROGEN OXIDES] CATALYST SHOWS PROMISE

MOST AUTOMOTIVE CATALYSTS FUNCTION BEST IN THE NARROW OPERATING WINDOW NEAR THE STOICHIOMETRIC AIR/FUEL RATIO WITH THE ACTIVE REDUCTANTS FAVORING OXYGEN OVER NITRIC OXIDE AS AN OXIDIZING AGENT. DISCOVERY OF CATALYSTS ABLE TO REDUCE NITROGEN OXIDE (NO) AND NITROGEN DIOXIDE (NO₂) TO NITROGEN IN THE PRESENCE OF EXCESS OXIDANTS PROMISES FUTURE DEVELOPMENT OF GOOD CATALYTIC CONVERSION OF AIR/FUEL RATIOS LEANER THAN STOICHIOMETRIC. A PARTICULAR CATALYST FORMULATION (LEANOX) WAS FOUND TO HAVE SIGNIFICANTLY HIGHER SELECTIVITY FOR NO REDUCTION THAN FRESH IR (IRIDIUM) OR TREATED PT (PLATINUM) AND RH (RHODIUM) CATALYSTS. THE USE OF THIS CATALYST UPSTREAM OF A CONVENTIONAL THREE-COMPONENT CONTROL CATALYST RESULTED IN INCREASING LEAN-SIDE NO CONVERSION BY A FACTOR OF AS MUCH AS THREE.

Publ: AUTOMOTIVE ENGINEERING V86 N5 P68-72 (MAY 1978)

1978

BASED ON SAE-780202 "THE SELECTIVE CATALYTIC REDUCTION OF NITRIC OXIDE IN THE PRESENCE OF EXCESS OXYGEN," BY GEORGE R. LESTER, GEORGE C. JOY, AND JOHN F. BRENNAN, PRESENTED AT SAE CONGRESS, DETROIT, 27 FEB-3 MAR 1978.

Availability: SEE PUBLICATION

HS-803 284

MOTOR VEHICLE INSPECTION: TRAINING STATE AND COMMUNITY INSTRUCTORS. FINAL REPORT

FIVE INSTRUCTOR TRAINING SESSIONS WERE ADMINISTERED FOR THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION'S (NHTSA) MVI (MOTOR VEHICLE INSPECTION) TRAINING INSTRUCTOR INSTITUTE AT VARIOUS LOCATIONS OVER THE PERIOD JUL 1976-MAR 1977. IN ADDITION TO TRAINING INSTRUCTORS IN THE MVI TRAINING CURRICULUM, THE SESSIONS WERE MEANT TO ACQUAINT STATE PERSONNEL WITH THE CONTENT AND SCOPE OF THE CURRICULUM. A TOTAL OF 73 STATE OR COMMUNITY PERSONNEL WERE SUCCESSFULLY TRAINED AS INSTRUCTORS AT THE VARIOUS SITES (SAN MATEO, CALIF.; MICHIGAN STATE UNIV.; CENTRAL CONNECTICUT STATE COLL.; NEW MEXICO

LAW ENFORCEMENT ACAD.; AND DEKALB COMMUNITY COLL., ATLANTA, GA.). EACH SESSION LASTED FOUR DAYS; THE MVI TRAINING CURRICULUM WAS REVIEWED, APPLICABLE TRAINING METHODS WERE TAUGHT, AND EACH ATTENDEE PRESENTED A LESSON SEGMENT FOR PRACTICE AND CRITIQUE. SOME PROBLEMS IN IMPLEMENTING THE NHTSA TRAINING AT THE STATE LEVEL WERE PERCEIVED, AND ONE FINAL MEETING AMONG STATE, NHTSA, AND CONTRACTOR PERSONNEL WAS HELD TO ADDRESS THE ISSUE OF IMPLEMENTATION. THE FOLLOWING ACTIONS WERE RECOMMENDED: FURTHER MODULARIZATION OF THE NHTSA TRAINING PACKAGE INTO "MINI-COURSES" (ONE SUCH MODULE FOR EACH SYSTEM TO BE INSPECTED); AMPLIFICATION OF THE GUIDANCE FOR THE INSTRUCTOR FOR THOSE INSPECTION ITEMS WHERE UNIVERSALLY ACCEPTED PROCEDURES AND INSPECTION CRITERIA CAN BE TAUGHT; REDUCTION OF ITEMS THAT ARE ESSENTIALLY ADMINISTRATIVE (E.G. TIRE SIZES AND TYPES AND GLAZING) TO CHECKLISTS REQUIRING MINIMUM TRAINING; DEVELOPMENT OF HIGH QUALITY VISUAL AIDS FOR ALL ASPECTS OF INSPECTION TO SUPPORT THE NHTSA COURSE ITSELF AND TO FACILITATE ADAPTATION; FURTHER EXPLORATION BY NHTSA OF THE RELATIONSHIP AMONG MODE OF TRAINING, TOTAL TRAINING TIME, AND INSPECTOR COMPETENCY; AND CONTINUED EXAMINATION BY NHTSA (WITH THE STATES AND WITH THE AMERICAN ASSOC. OF MOTOR VEHICLE ADMINISTRATORS (AAMVA)) OF THE DESIRED LEVEL AND EXTENT OF VEHICLE-IN-USE (VIU) INSPECTION STANDARDS.

by EDWARD W. BISHOP
DUNLAP AND ASSOCIATES, INC., ONE PARKLAND
DRIVE, DARIEN, CONN. 06820
DOT-HS-6-01362
1977; 152P
REPT. FOR JUN 1976-DEC 1977.
Availability: NTIS

HS-803 288

**ASAP [ALCOHOL SAFETY ACTION PROJECT] P.I.
AND E. [PUBLIC INFORMATION AND EDUCATION]
COUNTERMEASURE: SUMMARY OF ACTIVITIES
AND EFFECTIVENESS. FINAL REPORT**

A SUMMARY IS PRESENTED OF THE ACTIVITIES AND EFFECTIVENESS OF THE PUBLIC INFORMATION AND EDUCATION (P.I. AND E.) COUNTERMEASURES WHICH WERE CONDUCTED AS PART OF THE ALCOHOL SAFETY ACTION PROJECTS (ASAP'S) UNDER THE SPONSORSHIP OF THE DEPT. OF TRANSPORTATION. AN OVERVIEW OF EARLY COUNTERMEASURE OPERATIONS AND IMPACT (1971-1974) AT BOTH THE NATIONAL AND LOCAL PROJECT LEVELS IS PROVIDED. EMPHASIS IS PLACED ON THE ACTIVITIES AND EVALUATION FINDINGS FOR THE PERIOD 1975 THROUGH 1976, DURING WHICH TIME TEN ASAP'S WERE SELECTED FOR AN EXTENDED PERIOD OF OPERATION. A KEY P.I. AND E. EFFORT FOR THIS PERIOD WAS THE PROJECTS' USE OF THE NATIONALLY PRODUCED MEDIA MATERIALS FROM THE NATIONAL "FRIENDS DON'T LET FRIENDS DRIVE DRUNK" CAMPAIGN. EACH OF THE EX-

TENDED PROJECTS WAS ASKED TO IMPLEMENT THIS CAMPAIGN AND TO EVALUATE ITS IMPACT USING LOCAL TELEPHONE SURVEYS. AT THE SAME TIME, MOST PROJECTS ALSO CONTINUED THEIR OWN LOCALLY TAILORED P.I. AND E. PROGRAMS. EVIDENCE PRESENTED INDICATES THE ASAP P.I. AND E. COUNTERMEASURE HAD IMPACT UPON THE PUBLIC ATTITUDES, KNOWLEDGE, AND, TO SOME EXTENT, BEHAVIOR ASSOCIATED WITH DRINKING-DRIVING PROBLEMS. EVALUATIONS OF THE EARLY YEARS SHOWED THAT IF CAMPAIGNS SPECIFICALLY ADDRESSED A PARTICULAR ISSUE THEY WERE MORE LIKELY TO PRODUCE CHANGE ON THAT ISSUE. THE TELEPHONE SURVEYS IN 1975 AND 1976 SHOWED THAT PUBLIC AWARENESS OF THE DRUNK DRIVING PROBLEM HAD REACHED A HIGH STABLE LEVEL AND PUBLIC KNOWLEDGE ABOUT ALCOHOL HAD SIGNIFICANTLY INCREASED. PEOPLE'S ABILITY TO RECOGNIZE DRUNK DRIVING SITUATIONS, THEIR BELIEF IN PERSONAL RESPONSIBILITY FOR PREVENTING DRUNK DRIVING, AND THEIR DISCUSSION OF THE PROBLEM WERE ALL POSITIVELY INFLUENCED BY EXPOSURE TO ADVERTISING. INTERVENTION BEHAVIOR APPEARED LESS EASILY INFLUENCED BY ADVERTISING. FINALLY, SPECIAL EVALUATIONS OF LOCAL P.I. AND E. ACTIVITIES ALSO YIELDED FAVORABLE RESULTS.

by JULIE ANNE CROKE
TEKNEKRON, INC., 4701 SANGAMORE RD.,
WASHINGTON, D.C. 20016
NHTSA-6-A254
1977; 112P 6REFS
REPT. FOR 1 AUG 1976-31 JUL 1977.
Availability: NTIS

HS-803 294

**REVISION OF SIMULATION MODEL OF
AUTOMOBILE COLLISIONS (SMAC) COMPUTER
PROGRAM: INVESTIGATION OF NEW
INTEGRATION ALGORITHM. FINAL REPORT**

THE SIMULATION MODEL OF AUTOMOBILE COLLISION (SMAC) COMPUTER PROGRAM PROVIDES A DATA BANK FROM WHICH INFORMATION ON THE CAUSES AND CONSEQUENCES OF COLLISION ACCIDENTS INVOLVING TWO AUTOMOBILES CAN BE DRAWN AND TO AID HIGHWAY PLANNERS AND THE PUBLIC IN GENERAL TO AVOID UNNECESSARY ACCIDENTS AND MITIGATE THE EFFECTS OF THOSE WHICH ARE UNAVOIDABLE. THE ORIGINAL SMAC PROGRAM WAS BASED ON A FIXED TIME-STEP INTEGRATION METHOD (RUNGE-KUTTA). EFFORTS MADE TO IMPROVE THE EFFICIENCY OF SMAC BY INCORPORATING INTO IT THE NEWMARK BETA VARIABLE TIME-STEP METHOD ARE REPORTED. COMPARISONS ARE PROVIDED BETWEEN BASELINE RUNS (USING THE ORIGINAL SMAC) AND RUNS USING THE MODIFIED SMAC (CHI-SMAC), WHICH CONTAINS A UNIQUE INTEGRATION ALGORITHM BASED ON THE NEWMARK BETA METHOD BUT SPECIALIZED TO MEET THE OVERALL REQUIREMENTS OF THE SMAC PROGRAM. BASED ON PRELIMINARY INVESTIGATION OF THE NEW PROCEDURE, SIGNIFICANT PROGRESS HAS BEEN RECORDED IN REDUCING COMPUTER EXECUTION TIME. THE FOLLOWING

October 31, 1978

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STUDIES ARE RECOMMENDED IN AN EFFORT TO FURTHER IMPROVE THE PROGRAM: ADDITIONAL COMPUTER RUNS TO INVESTIGATE EFFECTS OF PARAMETER CHANGES ON RESULTS; A SYSTEMATIC, DETAILED STABILITY STUDY OF THE COMPUTATIONAL METHOD; A REDUCTION IN THE PROGRAM CORE MEMORY REQUIREMENTS; A MORE EFFICIENT APPROACH TO THE EVALUATION OF THE CONTACT FORCES BETWEEN THE COLLIDING VEHICLES; AND ANALYSIS OF OTHER VARIABLE TIME-STEP METHODS.

by M. CHI; E. NEAL; J. R. TUCKER
CHI ASSOCIATES, INC., 1011 ARLINGTON BLVD.,
SUITE 316, ARLINGTON, VA. 22209
DOT-HS-7-01545
1977; 142P 8REFS
REPT. FOR DEC 1976-MAY 1977.
Availability: NTIS

HS-803 296

INCREASED D.U.I. [DRIVING UNDER THE INFLUENCE] ENFORCEMENT PROGRAM, STOCKTON, CALIFORNIA. SECOND ANNUAL REPORT

THE FIRST FULL YEAR OF ACTIVITY (1976) OF THE STOCKTON, CALIF. INCREASED DUI (DRIVING UNDER THE INFLUENCE) ENFORCEMENT PROG. IS REPORTED, INCLUDING AN EVALUATION OF THE PRODUCTIVITY AND EFFECTIVENESS OF THE PROJECT. THE ENFORCEMENT PROGRAM UTILIZES INCREASED LEVELS OF PERSONNEL SPECIFICALLY FOR THE PURPOSE OF REDUCING THE NUMBER OF ALCOHOL-RELATED ACCIDENTS THROUGH THE DETECTION AND APPREHENSION OF PERSONS DRIVING UNDER THE INFLUENCE OF INTOXICANTS. THE EVALUATION DESIGN PLANS PROVIDED FOR THE CITY OF STOCKTON TO BE DIVIDED INTO OPERATIONAL AREAS, WITH INCREASED ENFORCEMENT BEING PROVIDED IN EACH AREA FOR A PERIOD OF SIX MONTHS. A PRELIMINARY REVIEW OF THE RESULTS FROM THE FIRST OPERATIONAL YEAR INDICATES THAT THE INCREASED DUI ENFORCEMENT PROG. HAS BEEN EFFECTIVE. THERE WAS A CITY-WIDE DECREASE IN ALCOHOL-RELATED COLLISIONS DURING THE EXPERIMENTAL PERIODS, AND THE NUMBER OF DUI'S SURVEYED AT THE SITES WAS SIGNIFICANTLY REDUCED WHEN COMBINED ACROSS AREAS. THE TRAFFIC TASK FORCE WORKING DURING THE EXPERIMENTAL PERIODS ACCOUNTED FOR MORE DUI ARRESTS THAN THOSE EFFECTED BY PATROL FOR ALL TIME FRAMES AS WELL AS THE ISSUANCE OF A SIGNIFICANT NUMBER OF OTHER TRAFFIC VIOLATION CITATIONS.

by JANET HAUSE; EDWARD CHAVEZ; ROSEANNE HANNON; DOUGLAS MATHESON
STOCKTON POLICE DEPT., STOCKTON, CALIF.;
UNIVERSITY OF THE PACIFIC, STOCKTON, CALIF.
DOT-HS-5-01194
Rept. No. AR-2; 1977; 105P 3REFS
REPT. FOR JAN-DEC 1976.
Availability: NTIS

HS-803 306

STEERING CONTROLLABILITY CHARACTERISTICS. FINAL REPORT

THE RELATIONSHIP WAS EXAMINED OF THE STEERING CONTROLLABILITY CHARACTERISTICS OF DOMESTICALLY PRODUCED SUBCOMPACT, COMPACT, AND INTERMEDIATE-SIZE AUTOMOBILES TO SPECIFICATIONS ON YAW-RATE GAIN AND RESPONSE TIME AS DEVELOPED IN NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION (NHTSA) RESEARCH PROGRAMS. AN ANALYTICAL SURVEY WAS MADE OF THE YAW RESPONSE OF 1977 VEHICLES, AND OPEN-LOOP AND CLOSED-LOOP TESTING WAS CONDUCTED FOR THREE SELECTED VEHICLES IN MODIFIED AND UNMODIFIED CONDITIONS. IT WAS FOUND THAT, WITH THE EXCEPTION OF SOME VEHICLE MODELS EQUIPPED WITH MANUAL STEERING, THE DIRECTIONAL PERFORMANCE CHARACTERISTICS OF CURRENTLY PRODUCED SUBCOMPACT, COMPACT, AND INTERMEDIATE-SIZE CARS LIE WITHIN THE "OPTIMUM" REGION THAT HAS BEEN DEFINED THROUGH NHTSA RESEARCH. THE OBVIOUS MODIFICATION TO BRING MANUAL STEERING CARS INTO THE SPECIFIED PERFORMANCE SPACE IS TO EQUIP THEM WITH POWER STEERING. ANOTHER APPROACH WOULD BE TO DECREASE THE STEERING RATIO, BUT THIS MIGHT INCREASE THE STEERING-WHEEL TORQUE TO AN OBJECTIONABLE LEVEL. FURTHER EFFORT IN DEFINING SAFETY RELATED HANDLING REQUIREMENTS IS NEEDED BEFORE IMPLEMENTING VEHICLE PERFORMANCE SPECIFICATIONS.

by P. S. FANCHER; C. B. WINKLER; C. C. MACADAM; L. SEGEL; C. MALLIKARJUNARAO
UNIVERSITY OF MICHIGAN, HWY. SAFETY RES.
INST., HURON PKWY. AND BAXTER RD., ANN ARBOR,
MICH. 48109
DOT-HS-6-01409
1977; 189P 41REFS
REPT. FOR 1 AUG 1976-1 SEP 1977.
Availability: NTIS

HS-803 308

SAFETY RELATED RECALL CAMPAIGNS FOR MOTOR VEHICLES AND MOTOR VEHICLE EQUIPMENT, INCLUDING TIRES, REPORTED TO THE NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION BY DOMESTIC AND FOREIGN VEHICLE MANUFACTURERS, JANUARY 1, 1977 TO DECEMBER 31, 1977

THIS TABULATION OF SAFETY DEFECT RECALL CAMPAIGNS FOR MOTOR VEHICLES AND MOTOR VEHICLE EQUIPMENT (INCLUDING TIRES) INCLUDES THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION (NHTSA) IDENTIFICATION NUMBER, DATE OF COMPANY NOTIFICATION, MAKE, MODEL, MODEL YEAR, BRIEF DESCRIPTION OF DEFECT AND MANUFACTURER'S CORRECTIVE ACTION, NUMBER OF PAGES ON FILE, AND NUMBER OF VEHICLES RECALLED. THE STATUS OF DOMESTIC AND FOREIGN CAMPAIGNS COMPLETED AS OF 30 SEP 1977 IS ALSO GIVEN. POSTAL VEHICLES, AUTOMOBILES, TRAILERS, BUSES, MOTOR HOMES, TRUCKS, POLICE

VEHICLES, MOTORCYCLES, TRACTORS, FIRE TRUCKS, MOPEDS, TROLLEYS, HELMETS, WHEELS, CRUISE CONTROLS, ANTISKID SYSTEMS, FIFTH WHEEL COUPLER HITCHES, ENGINES, FURNACES, AXLES, SHUTTERSTAT FLUIDS, BACKRESTS, AIR SUSPENSIONS, LIFT GATES, SLIDE-IN CAMPERS, HYDRAGUARD HYDRAULIC UNITS, WINDOW GLASS, HUBS, STEERING GEAR, AND TIRES ARE INCLUDED.

NATIONAL HWY. TRAFFIC SAFETY
ADMINISTRATION, WASHINGTON, D.C. 20590
1978; 108P
Availability: GPO, STOCK NO. 050-003-00312-3

HS-803 337

THE EFFECT OF LOWER LEGAL DRINKING AGES ON YOUTH CRASH INVOLVEMENT. FINAL SUMMARY REPORT

THE IMPACT OF LOWERING THE LEGAL DRINKING AGE TO 18 IN MICHIGAN, VERMONT, AND MAINE ON THE ALCOHOL-RELATED (A/R) HIGHWAY CRASH EXPERIENCE OF THE AFFECTED YOUNG DRIVING POPULATIONS WAS INVESTIGATED. FOR COMPARISON WITH THESE THREE STATES (AS WELL AS WITH THREE MICHIGAN COUNTIES USED AS SUBSETS), ACCIDENT RECORDS WERE ALSO ANALYZED FOR NEW YORK AND LOUISIANA, THE ONLY STATES HAVING LONG-TERM 18-YEAR-OLD LEGAL DRINKING AGES, AND FOR PENNSYLVANIA AND TEXAS WHICH WERE SELECTED AS LONG-TERM 21-YEAR-OLD CONTROL STATES. STATISTICAL-ANALYSES SHOW THAT IN MICHIGAN, WITH THE EXCEPTION OF WAYNE COUNTY (EXCLUDING DETROIT), THERE IS STRONG EVIDENCE THAT NONFATAL, A/R CRASHES OF THE 18-YEAR-OLD TO 20-YEAR-OLD GROUP INCREASED AT A HIGHLY SIGNIFICANT LEVEL AFTER THE LEGAL DRINKING AGE WAS LOWERED. THERE WAS NO INCREASE IN A/R CRASHES AMONG THE OLDER COMPARISON GROUP WHICH SUPPORTS A CAUSAL RELATIONSHIP BETWEEN AN EXTERNAL INFLUENCE ON THE 18-YEAR-OLDS TO 20-YEAR-OLDS WHICH DID NOT OPERATE ON THE 21-YEAR-OLD TO 45-YEAR-OLD GROUP. THIS INFLUENCE WAS THE LOWER LEGAL DRINKING AGE. IN MAINE, THE REPORTED ALCOHOL INVOLVEMENT INCREASED FOR THE 18-YEAR-OLDS TO 19-YEAR-OLDS AND REMAINED STABLE FOR THE 20-YEAR-OLD TO 44-YEAR-OLD GROUP. THE LEGAL DRINKING AGE CHANGED FROM 21 TO 20 IN 1969 WHICH MIGHT HAVE SOFTENED THE IMPACT OF THE CHANGE TO 18 IN JUN 1972. ALTHOUGH THE YOUNG DRIVER THREE-FACTOR SURROGATE INCREASED, STATISTICAL SIGNIFICANCE OF THE SHIFT AT THE .05 LEVEL WAS NOT ATTAINED. IF THE SHORT (SEVEN-MONTH) "AFTER" PERIOD WERE LONGER, STATISTICAL SIGNIFICANCE WOULD HAVE BEEN REACHED. NO SHIFT IN MAGNITUDE WAS FOUND FOR ANY CRASH FREQUENCY OR RATE IN VERMONT FOLLOWING THE LOWER LEGAL DRINKING AGE. NO EVIDENCE WAS FOUND IN ANY CONTROL STATE THAT THE 18-YEAR-OLD TO 20-YEAR-OLD A/R CRASH EXPERIENCE INCREASED EXCEPT IN PENNSYLVANIA WHERE THE OLDER GROUP EXPERIENCE INCREASED AS WELL. IN MICHIGAN, AND PROBABLY IN MAINE, A/R CRASHES INCREASED BEYOND ANY NORMALLY EXPECTED LEVEL AFTER

THE LEGAL DRINKING AGES WERE CHANGED. SOME POSSIBLE REASONS WHY THERE WAS NO EVIDENCE OF AN INCREASE IN THE CRASH EXPERIENCE IN VERMONT AS A RESULT OF THE LOWER LEGAL DRINKING AGE INCLUDE THE FOLLOWING: SINGLE YEAR OF "BEFORE" DATA INADEQUATE TO MEASURE CHANGES BASED ON A LONG-TERM COMPARISON, SUCCESSFUL OPERATION OF AN ALCOHOL SAFETY ACTION PROJECT DURING 1971-1972, AND INFLUENCE OF NEW YORK STATE WITH ITS 18-YEAR-OLD DRINKING AGE WHICH HAS BEEN IN EFFECT SINCE 1934.

by RICHARD L. DOUGLASS; LYLE D. FILKINS
UNIVERSITY OF MICHIGAN, HWY. SAFETY RES.
INST., ANN ARBOR, MICH.
DOT-HS-031-3-754
1974; 11P IREF
Availability: REFERENCE COPY ONLY

HS-803 338

RESULTS OF SPECIAL ACCIDENT STUDY TEAMS/ASAP [ALCOHOL SAFETY ACTION PROGRAM] COORDINATION CONFERENCE, JUNE 12-13, 1974, WASHINGTON, D.C.

MEMBERS OF FOUR ACCIDENT INVESTIGATION TEAMS (BOSTON UNIV., MARYLAND MEDICAL-LEGAL FOUNDATION, UNIV. OF NEW MEXICO, AND UNIV. OF OKLAHOMA) STUDYING THE ALCOHOL/DRUG PROBLEM IN THEIR AREA, THE FOUR ASAP'S IN THE STUDY AREAS (BOSTON, BALTIMORE, ALBUQUERQUE, AND OKLAHOMA CITY), NHTSA (NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION) REGIONAL REPRESENTATIVES, AND MEMBERS OF THE NHTSA MONITORING GROUPS (OFFICE OF STATISTICS AND ANALYSIS, OFFICE OF DRIVER AND PEDESTRIAN PROGRAMS) ALL MET FOR THE TWO-DAY CONFERENCE TO CONTINUE COORDINATION OF ACTIVITIES AND TO REPORT RECENT FINDINGS. SECTION 1 OF THIS REPORT CONTAINS A LIST OF ATTENDEES, THE AGENDA, AND THE MINIMAL SET OF HUMAN FACTORS DATA AGREED UPON AT THE FIRST CONFERENCE (JUL 1973). SECTION 2 CONTAINS SYNOPSIS AND MATERIALS FROM THE ACCIDENT TEAM PRESENTATIONS. SYNOPSIS OF PROGRESS OF THE ASAP'S APPEAR IN SECTION 3. SECTION 4 CONTAINS SYNOPSIS OF THE PRESENTATIONS ON THE FUTURE OF THE ASAP PROGRAM AND THE FUTURE OF THE SPECIAL ACCIDENT STUDY TEAMS. FINALLY, SECTION 5 CONTAINS FINAL REPORT REQUIREMENTS FOR FUTURE SPECIAL ACCIDENT STUDY TEAMS (14 REQUIRED TABLES, A DRIVER PROFILE, A UNIVARIATE DISTRIBUTION OF ALL THE VARIABLES COLLECTED IN THE MINIMAL SET OF HUMAN FACTORS DATA, AND POPULATION DATA).

by JAMES C. FELL, ED.
NATIONAL HWY. TRAFFIC SAFETY
ADMINISTRATION, OFFICE OF STATISTICS AND
ANALYSIS, ACCIDENT INVESTIGATION DIV.,
WASHINGTON, D.C. 20590
1974; 112P
Availability: REFERENCE COPY ONLY

HS-803 346

CHILD RESTRAINT SYSTEMS TESTING. FINAL REPORT

THE PHYSICAL CHARACTERISTICS OF CHILD RESTRAINT SYSTEMS, DESIGNED FOR USE IN MOTOR VEHICLES, WERE DETERMINED, AND SAFETY PERFORMANCE DATA WERE OBTAINED BY PERFORMING WEBBING TENSILE AND STRETCH TESTS, HEAD-FORM IMPACT TESTS AND SLED TESTS, AS WELL AS EXAMINING A CALIBRATION PROCEDURE FOR THE THREE-YEAR-OLD CHILD DUMMY. THE FOLLOWING CHILD RESTRAINT SYSTEMS WERE TESTED: FORD TOT GUARD, CHRYSLER GUARDWELL, PETERSON SAFETY SHELL 75, STROLEE WEE CARE, BUNNY BEAR NEW MOULDED CAR SEAT (FOUR-POSITION MODEL), KANTWET MODEL 988, GENERAL MOTORS INFANT CARRIER, GENERAL MOTORS CHILD LOVE SEAT, BOBBY MAC DELUXE 7812, HEDSTROM POSITEST, CENTURY TRAVEL GUARD 4448, PRIDE TRIMBLE, ROSE AUTO SAFETY HARNESS, BUILT-RITE MODEL K92, KANTWET 486, KANTWET 584, KANTWET 986, SWYNGOMATIC 302, PRIDE TRIMBLE 876, TEDDY-TOT UNIVERSAL 7316, TEDDY-TOT ASTRO SEAT V 8900, TEDDY-TOT TILT-A-BABE 7600, AND COSCO SAFE AND EASY. BASED ON THE DATA OBTAINED IN THIS TEST PROGRAM, IT IS CONCLUDED THAT ALL SEATS EXHIBITED MINOR PROBLEMS, AND SEVERAL SEATS SUSTAINED MAJOR STRUCTURAL DAMAGE. A MAJOR FAILURE, TETHER STRAP BREAKAGE, OCCURRED IN TWO CHILD RESTRAINTS DURING THE SLED TESTING. ALL CHILD RESTRAINTS RETAINED THE TEST DUMMY THROUGHOUT THE SLED TEST. ONLY 38 RESTRAINTS OUT OF THE 56 TESTED PREVENTED THE DUMMY'S HEAD FROM PENETRATING THE FORWARD 30-INCH PLANE. OF EIGHT CHILD RESTRAINTS SEATED IN THE RIGHT PASSENGER SEATING POSITION DURING THE 60° LATERAL SLED IMPACT TESTS, SEVEN ALLOWED THE DUMMY'S HEAD TO HIT THE SIMULATED PASSENGER DOOR PANEL. OF 13 CHILD RESTRAINTS TESTED ON THE SLED WITH TETHER STRAPS, TWO TETHER STRAPS FAILED. FINALLY, OF 46 RESTRAINTS THAT USED A BUCKLED HARNESS, SIX BUCKLES OPENED DURING SLED TESTING.

by ANTHONY R. BAYER, JR.; BILLY S. PETERSON
NATIONAL HWY. TRAFFIC SAFETY
ADMINISTRATION, ENGINEERING TEST FACILITY,
P.O. BOX 37, EAST LIBERTY, OHIO 43319
Rept. No. OCW-477-1; OCW-1277-3; 1978; 85P
REPT. FOR APR 1977-MAY 1978. APPENDIX IS HS-803
347.

Availability: NHTSA

HS-803 347

CHILD RESTRAINT SYSTEMS TESTING. APPENDIX

GRAPHS OF DUMMY ACCELERATION DATA FOR SLED TESTS CONDUCTED TO EVALUATE CHILD RESTRAINT SYSTEMS ARE PRESENTED. THE TESTING CONSISTED OF 60° LATERAL IMPACTS, 30 MPH FRONTAL IMPACTS, AND 20 MPH FRONTAL IMPACTS. THE FOLLOWING CHILD RESTRAINT SYSTEMS WERE TESTED: FORD TOT GUARD, CHRYSLER GUARD-

WELL, PETERSON SAFETY SHELL 75, STROLEE WEE CARE, BUNNY BEAR NEW MOULDED CAR SEAT (FOUR-POSITION MODEL), KANTWET MODEL 988, GENERAL MOTORS INFANT CARRIER, GENERAL MOTORS CHILD LOVE SEAT, BOBBY MAC DELUXE 7812, HEDSTROM POSITEST, CENTURY TRAVEL GUARD 4448, PRIDE TRIMBLE, ROSE AUTO SAFETY HARNESS, BUILT-RITE MODEL K92, KANTWET 486, KANTWET 584, KANTWET 986, SWYNGOMATIC 302, PRIDE TRIMBLE 876, TEDDY-TOT UNIVERSAL 7316, TEDDY-TOT ASTRO SEAT V 8900, TEDDY-TOT TILT-A-BABE 7600, AND COSCO SAFE AND EASY.

by ANTHONY R. BAYER, JR.; BILLY S. PETERSON
NATIONAL HWY. TRAFFIC SAFETY
ADMINISTRATION, ENGINEERING TEST FACILITY,
P.O. BOX 37, EAST LIBERTY, OHIO 43319
Rept. No. OCW-477-1; OCW-1277-3; 1978; 268P
FINAL REPT. IS HS-803 346.
Availability: NHTSA

HS-803 353

COURT PROCEDURES FOR IDENTIFYING PROBLEM DRINKERS. VOL. 3: SCORING KEYS (REVISED)

DIRECTIONS FOR SCORING A QUESTIONNAIRE AND INTERVIEW DEVELOPED FOR IDENTIFYING PROBLEM DRINKERS, A DISCUSSION OF HOW TO INTERPRET THE SCORES, AND A GUIDE FOR CODING AND KEYPUNCHING OF THE QUESTIONNAIRE AND INTERVIEW RESPONSES ARE PRESENTED. THREE SEPARATE SCORING KEYS ARE PROVIDED, TWO FOR SCORING THE QUESTIONNAIRE AND ONE FOR SCORING THE INTERVIEW. THE SCORING PROCEDURE IS STRAIGHTFORWARD AND RESULTS IN AN ARITHMETIC SCORE WHICH PLACES THE RESPONDENT IN ONE OF THREE CATEGORIES: PROBLEM DRINKER, PRESUMPTIVE PROBLEM DRINKER, OR NONPROBLEM DRINKER. THE QUESTIONNAIRE/INTERVIEW WAS INTENDED FOR USE IN A COURT SETTING, SUCH AS A PRESENTENCE INVESTIGATION, BUT IS GENERALLY APPLICABLE IN A WIDE RANGE OF SETTINGS. AN OBJECTIVE OF THE QUESTIONNAIRE/INTERVIEW WAS TO PROVIDE A TOOL FOR PERSONS NOT HAVING A GREAT DEAL OF PRIOR EXPERIENCE OR EXPERTISE IN DIAGNOSING PROBLEM DRINKERS TO BE ABLE TO IDENTIFY THESE TYPES OF INDIVIDUALS, AND IT IS FELT THAT THIS OBJECTIVE HAS BEEN SUBSTANTIALLY ACHIEVED.

by J. S. LOWER; R. G. MORTIMER; L. D. FILKINS
UNIVERSITY OF MICHIGAN, HWY. SAFETY RES.
INST., HURON PKWY. AND BAXTER RD., ANN ARBOR,
MICH. 48105
FH-11-7615
1971; 40P
THIS VERSION SHOULD REPLACE TWO EARLIER
VERSIONS OF THE SAME COVER AND DATE.
Availability: NTIS

HS-803 356

**VEHICLE ANTI-THEFT SECURITY SYSTEM DESIGN
[INCLUDING MONTHLY PROGRESS REPORT FOR
FEBRUARY 1978]**

TABLES ACCOMPANYING A BRIEFING ON A VEHICLE THEFT SURVEY AND CONCEPT DESIGN WORK ON A VEHICLE ANTITHEFT SYSTEM ARE PRESENTED. THE WORK IS PART OF A PROGRAM TO DEVELOP AND RECOMMEND MODIFICATIONS TO FEDERAL MOTOR VEHICLE SAFETY STANDARD (FMVSS) 114, THEFT PROTECTION--PASSENGER CARS, WHICH WILL IMPROVE ANTITHEFT SYSTEM PERFORMANCE. THE TABLES CONTAIN DATA ON THE FOLLOWING SUBJECTS: MASSACHUSETTS THEFT RATE--JAN 1974 (NUMBER OF THEFTS PER THOUSAND VEHICLE REGISTRATIONS) BY MODEL YEAR FOR FIVE MANUFACTURERS ACCORDING TO VEHICLES WITH/WITHOUT STEERING COLUMN LOCKS; PURPOSE OF THEFT; BREAKDOWN OF AUTO THEFT BY MOTIVE; TOTAL ESTIMATED COSTS FOR RECOVERED VEHICLES; SUMMARY OF VEHICLES STOLEN WITH A KEY IN THE IGNITION LOCK; MINIMUM TIME FOR REMOVAL OF IGNITION LOCK CYLINDER BY MEANS OF A SLIDE-HAMMER; CURRENT ANTITHEFT SYSTEMS (FACTORY-INSTALLED, RETROFIT SYSTEMS); THEFT METHODS; PERFORMANCE CRITERIA FOR ANTITHEFT SYSTEMS (FUNCTIONAL, ATTACK RESISTANCE, ACCESSIBILITY, CONSPICUOUSNESS); SUMMARY OF ESTIMATED AUTO-THEFT COSTS BY TYPE OF THEFT; PERFORMANCE CRITERIA RANKING MATRIX; RANKED PERFORMANCE CRITERIA; CONCEPT MATRIX, ANTIMOBILIZATION; AND DOOR LOCK IMPROVEMENTS. WITH RESPECT TO PROGRESS MADE DURING FEB 1978 ON THE PROJECT TO IMPROVE ANTITHEFT SYSTEM PERFORMANCE, THE FOLLOWING WAS ACCOMPLISHED: COMPLETION OF CONCEPT GENERATION, IDENTIFICATION OF MOST PROMISING CONCEPTS, ANALYSIS OF THESE CONCEPTS BEGUN, COMPARISON OF EXISTING STANDARDS AND THE FORMULATION OF RECOMMENDED IMPROVEMENTS BEGUN, AND A BRIEFING GIVEN AT THE NATIONAL HWY. TRAFFIC SAFETY ADMINISTRATION.

by JOHN S. HOWLAND
ARTHUR D. LITTLE, INC., ACORN PARK, CAMBRIDGE,
MASS. 02140
DOT-HS-7-01723
1978; 22P
SEE ALSO HS-803 357 AND HS-803 358.
Availability: NHTSA

HS-803 357

**COMPARISON OF EXISTING ANTI-THEFT
STANDARDS AND PRELIMINARY
RECOMMENDATION FOR MODIFICATIONS.
INTERIM REPORT, MARCH 1978**

IN CONJUNCTION WITH A PROGRAM TO DEVELOP AND RECOMMEND MODIFICATIONS TO FEDERAL MOTOR VEHICLE SAFETY STANDARD (FMVSS) 114, THEFT PROTECTION--PASSENGER CARS, WHICH WILL IMPROVE ANTITHEFT SYSTEM PERFORMANCE, A DETAILED COMPARISON OF THE CURRENT U.S. STANDARD AND ITS EUROPEAN COUNTERPART, ECE

(ECONOMIC COMMISSION FOR EUROPE) REGULATION 18, IS PRESENTED AND PRELIMINARY RECOMMENDATIONS IN THE FORM OF A SPECIMEN MODIFIED FMVSS 114 ARE PROVIDED. THE STANDARD WHICH IS RECOMMENDED APPLIES TO LIGHT TRUCKS AND MULTIPURPOSE VEHICLES IN ADDITION TO PASSENGER CARS. IT SPECIFIES MINIMUM PERFORMANCE IN WAYS WHICH ARE NOT DESIGN RESTRICTIVE.

by JOHN S. HOWLAND
ARTHUR D. LITTLE, INC., ACORN PARK, CAMBRIDGE,
MASS. 02140
DOT-HS-7-01723
1978; 21P
SEE ALSO HS-803 356 AND HS-803 358.
Availability: NHTSA

HS-803 358

**PRELIMINARY DESIGN REPORT, INTERIM
REPORT, APRIL 1978 [VEHICLE ANTITHEFT
SYSTEM]**

IN CONJUNCTION WITH A PROGRAM TO DEVELOP AND RECOMMEND MODIFICATIONS TO FEDERAL MOTOR VEHICLE SAFETY STANDARD (FMVSS) 114, THEFT PROTECTION--PASSENGER CARS, WHICH WILL IMPROVE ANTITHEFT SYSTEM PERFORMANCE, PRELIMINARY TASKS IN THE DESIGNING AND TESTING OF AN ADVANCED ANTITHEFT SYSTEM CULMINATING IN THE RECOMMENDED SYSTEM DESIGN FOR VALIDATION TESTING IN THIS PROGRAM ARE REPORTED. FIRST, THE RANKED PERFORMANCE CRITERIA (MOBILIZATION PROTECTION--FUNCTIONAL, MOBILIZATION PROTECTION--ACTIVATION REQUIREMENT, ENTRY PROTECTION--FUNCTIONAL, VISUAL CONSPICUOUSNESS, ATTACK RESISTANCE--MINIMUM TIME TO MOBILIZE, ANTIDECODING (SEPARATE DOOR COMBINATIONS), MOBILIZATION PROTECTION--ACCESSIBILITY LIMITATION, CONSPICUOUSNESS--AURAL (ALARM), ANTIKEY RETENTION--PHYSICAL, ENTRY PROTECTION--ACCESSIBILITY LIMITATION, ENTRY PROTECTION--ACTIVATION REQUIREMENT, AND ANTIKEY RETENTION--HORN ALARM) WERE TRANSLATED INTO A SET OF FAIRLY EXPLICIT DESIGN GOALS. THEN A CONCEPTUAL DESIGN STUDY WAS CONDUCTED TO IDENTIFY THE VARIOUS DESIGN CONCEPTS THAT CAN BE USED FOR EACH ELEMENT OF THE SYSTEM AND THESE CONCEPTS WERE EVALUATED FOR THEIR CAPABILITY IN MEETING THE DESIGN GOALS. FINALLY, THE OPTIMUM SET OF CONCEPTS WAS SELECTED FOR THE VALIDATION TESTS AND A PRELIMINARY DESIGN IS PRESENTED. THE CODE INSERTION/DECODING SYSTEM HAVING THE GREATEST CONFIDENCE OF MEETING THE THEFT RESISTANCE GOALS FOR THE TEST SYSTEM WAS CONCLUDED TO BE A REMOTE ELECTRONIC DECODER ACTIVATED FROM THE PASSENGER COMPARTMENT. A KEYBOARD WAS CHOSEN AS THE OPTIMUM CODE INSERTION DEVICE SINCE IT PRECLUDES LEAVING A KEY IN THE CAR. SEVERAL CRITICAL VEHICLE FUNCTIONS ARE PROMISING FOR MOBILIZATION PROTECTION. HOWEVER, SINCE THE ELECTRONIC DECODER MUST BE HOUSED ALONG WITH THE LATCHING MECHANISM, SUITABLE THERMAL EN-

October 31, 1978

HS-810 320

VIRONMENT FOR THE ELECTRONICS CAN BE ACHIEVED IN A RETROFIT DESIGN MOST EASILY BY LOCKING THE STEERING SYSTEM AT THE STEERING GEARBOX. IN AN EXISTING VEHICLE, SUBSTANTIALLY IMPROVED ENTRY PROTECTION CAN BE ACHIEVED BY SHIELDING THE CRITICAL ELEMENTS IN THE DOOR LOCK MECHANISM AGAINST ACCESS FROM OUTSIDE, REDESIGNING THE INTERIOR LOCK RELEASES, AND ELIMINATING VENT WINDOWS. THESE CONCEPTS SHOULD BE CARRIED INTO THE DETAILED DESIGN AND FABRICATION PHASE FOLLOWING THE PRELIMINARY DESIGN PRESENTED HEREIN.

by JOHN S. HOWLAND
ARTHUR D. LITTLE, INC., ACORN PARK, CAMBRIDGE,
MASS. 02140
DOT-HS-7-01723
1978; 46P 7REFS
SEE ALSO HS-803 356 AND HS-803 357.
Availability: NHTSA

HS-810 312

**STATEMENT BEFORE THE SUBCOMMITTEE ON
CONSUMER, SENATE COMMITTEE ON
COMMERCE, SCIENCE, AND TRANSPORTATION,
CONCERNING AUTHORIZATIONS FOR THE
IMPLEMENTATION OF THE NATIONAL TRAFFIC
AND MOTOR VEHICLE SAFETY ACT, AND THE
MOTOR VEHICLE INFORMATION AND COST
SAVINGS ACT, MARCH 21, 1978**

S. 2604 IS A BILL TO PROVIDE AUTHORIZATIONS FOR FISCAL 1979 AND 1980 FOR THE NATIONAL TRAFFIC AND MOTOR VEHICLE SAFETY ACT AND THE MOTOR VEHICLE INFORMATION AND COST SAVINGS ACT. THE FEDERAL ROLE IN FOSTERING EFFECTIVE SOLUTIONS TO CONSUMER PROBLEMS WITH AUTO REPAIR IS DISCUSSED. MORE THAN HALF OF THE ESTIMATED \$20 BILLION WASTED ON AUTO REPAIRS IN 1977 WAS THE RESULT OF FRAUDULENT, INCOMPETENT, OR UNNECESSARY REPAIRS PERFORMED BY THE REPAIR INDUSTRY; THE REMAINING LOSSES APPEAR TO BE ATTRIBUTABLE TO NEW CAR DESIGN OR A LACK OF OWNER UNDERSTANDING OF HIS/HER CAR'S MAINTENANCE AND REPAIR NEEDS. TO EMPHASIZE THE LONG-STANDING NATURE OF THE AUTO REPAIR PROBLEM, A COPY OF AN ARTICLE ENTITLED "THE REPAIR MAN WILL GYP YOU IF YOU DON'T WATCH OUT" FROM THE JUL 1941 EDITION OF THE READER'S DIGEST IS INCLUDED. THE COMPLEXITY OF THE PROBLEM AND THE DIVERSE NATURE OF THE REPAIR INDUSTRY ARE THE TWO CRITICAL FACTORS THAT MUST BE KEPT IN MIND IN ARRIVING AT THE MOST EFFECTIVE DEFINITION OF THE APPROPRIATE FEDERAL ROLE. NHTSA BELIEVES THAT THE REMEDIES MOST LIKELY TO SUCCEED ARE THOSE WHICH ARM THE INDIVIDUAL CONSUMER WITH THE TOOLS HE/SHE NEEDS TO SOLVE THE PROBLEM BY HIMSELF/HERSELF. THE FEDERAL GOVERNMENT CAN ENHANCE THE ABILITY OF CONSUMERS TO PROTECT THEMSELVES IN THE FOLLOWING SIX KEY AREAS: CONTINUED SUPPORT TO STATE AND LOCAL GOVERNMENTS TO FACILITATE THEIR DEVELOPMENT OF DIAGNOSTIC VEHICLE INSPECTION, LEGAL REMEDIES FOR CON-

SUMERS PROVIDING RIGHTS OF ACTION FOR CASES OF FRAUD OR OTHER ILLEGAL ACTIVITY IN AUTO REPAIR, VEHICLE STANDARDS THAT CAN REDUCE MAINTENANCE REQUIREMENTS AND CAN WARN OWNERS OF THE NEED TO REPAIR THEIR VEHICLES, DEVELOPMENT OF INFORMATION TO AID CONSUMERS IN THEIR CHOICE OF VEHICLES AND TO HELP THEM UNDERSTAND THEIR VEHICLE'S MAINTENANCE REQUIREMENTS, INVESTIGATION AND REGULATION OF UNFAIR TRADE PRACTICES BY THE FEDERAL TRADE COMMISSION, AND GOVERNMENTAL ASSISTANCE TO FOSTER THE ESTABLISHMENT AND OPERATION OF CONSUMER COOPERATIVES. SPECIFIC ASPECTS OF NHTSA'S IMPLEMENTATION OF THE VEHICLE SAFETY ACT (PASSIVE RESTRAINT AND AIR BRAKE SYSTEM STANDARDS, COLLECTION OF ACCIDENT DATA, DEFECT RECALL CAMPAIGNS) AND THE COST SAVINGS ACT (COST-SAVINGS BUMPER STANDARD, MOTOR VEHICLE DIAGNOSTIC INSPECTION DEMONSTRATION PROJECTS, SPEEDOMETER AND ODOMETER STANDARDS, OTHER ANTI-FRAUD AND ANTI-THEFT PROGRAM ACTIVITIES, FUEL ECONOMY STANDARDS) ARE DISCUSSED.

by JOAN B. CLAYBROOK
NATIONAL HWY. TRAFFIC SAFETY
ADMINISTRATION, WASHINGTON, D.C. 20590
1978; 46P 4REFS
Availability: NHTSA

HS-810 320

**REMARKS BEFORE THE MOTORCYCLE SAFETY
FOUNDATION, APRIL 19, 1978, WASHINGTON, D.C.**

MOTORCYCLING IS THE MOST HAZARDOUS FORM OF PERSONAL TRANSPORTATION IN THE U.S. TODAY; THE HIGH RISK STEMS MAINLY FROM THE VULNERABILITY OF THE RIDER TO INJURY WHEN A CRASH OCCURS. AN ESTIMATED 4067 MOTORCYCLISTS WERE KILLED IN CRASHES IN THE U.S. DURING 1977, THE WORST RECORD TO DATE. THE SUBSTANTIAL REDUCTION IN HELMET USE THROUGHOUT THE COUNTRY DURING THAT YEAR WAS A PARTIAL CAUSE FOR THE INCREASE IN MOTORCYCLE FATALITIES. NHTSA AND THE MOTORCYCLE SAFETY FOUNDATION, TO WHICH THIS DISCUSSION IS ADDRESSED, AGREE ON TWO OF THE FIVE MAJOR FACTORS WHICH PARTICULARLY AFFECT THE SAFETY OF MOTORCYCLE RIDERS. FIRST, IT IS MUTUALLY AGREED THAT GREATER ATTENTION SHOULD BE PAID TO LICENSING OF MOTORCYCLE USERS, TO THE BREADTH AND DIFFICULTY OF THE KNOWLEDGE AND SKILL TESTS. SECOND, THERE IS AGREEMENT ON CONSPICUITY, THAT SPECIAL EFFORTS SHOULD BE MADE TO ASSURE THAT MOTORCYCLES ARE VISIBLE TO OTHER HIGHWAY USERS. HOWEVER, THERE IS DISAGREEMENT ON THREE FACTORS THAT EITHER SUBTLY OR OVERTLY AFFECT THE MARKETING AND SALES OF MOTORCYCLES AND AFFECT THE LIKELIHOOD OF DEATH AND CRIPPLING INJURY TO THE MOTORCYCLE USERS:

HS-803 356

HSL 78-10

SAFETY EDUCATION, MOTORCYCLE HORSEPOWER
CAPABILITIES, AND HELMET USE.

by JOAN CLAYBROOK

NATIONAL HWY. TRAFFIC SAFETY

ADMINISTRATION, WASHINGTON, D.C. 20590

1978; 8P

Availability: NHTSA

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PERIPHERAL EQUIPMENT FOR REDUCING MAINTENANCE OF ELECTRIC VEHICLE LEAD-ACID BATTERIES [ABSTRACT]

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October 31, 1978

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DEVELOPMENT OF HANDLING TEST PROCEDURES FOR MOTORCYCLES

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THE OSCILLATIONS OF A FLEXIBLE CASTOR, AND THE EFFECT OF FRONT FORK FLEXIBILITY ON THE STABILITY OF MOTORCYCLES

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ESTIMATION OF VEHICLE AERODYNAMIC DRAG
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AKTIEBOLAGET VOLVO, CAR DIV.
DEVELOPMENT OF THE VOLVO LAMBDA-SOND
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**AMERICAN SOCIETY OF TESTING AND
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THE RELATIONSHIP BETWEEN ENGINE OIL
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AMOCO OIL CO.
OIL VISCOSITY AT HIGH SHEAR RATES MEASURED
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**ARMY FUELS AND LUBRICANTS RES. LAB.,
SOUTHWEST RES. INST., P.O. DRAWER 28510, SAN
ANTONIO, TEX. 78284**
ENGINE PERFORMANCE AND FIRE-SAFETY
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**ARMY MOBILITY EQUIPMENT RES. AND DEVEL.
COMMAND, ELECTRICAL POWER LAB.**
DYNAMIC BEHAVIOR OF A 140,000 RPM 3 KW
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ARTHUR D. LITTLE, INC.
PERFORMANCE CAPABILITY OF NEAR-TERM ELEC-
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**ARTHUR D. LITTLE, INC., ACORN PARK,
CAMBRIDGE, MASS. 02140**
VEHICLE ANTI-THEFT SECURITY SYSTEM DESIGN
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**ASSOCIATION PEUGEOT-RENAULT,
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**BIOMECHANIQUE, 18 RUE DES FAUVELLES, 92250
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A STUDY OF 171 MOTORBIKE ACCIDENTS. FINAL
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**AUTOMOBILE ASSOC., DRIVE MAGAZINE, FANUM
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THE CAR, THE LAW AND THE CONSUMER; THE
BOUNDARIES OF RESPONSIBILITY [GREAT
BRITAIN]
HS-023 103

**AUTOMOTIVE SERVICE COUNCILS, INC., 1625 K
ST., N.W., SUITE 1205, WASHINGTON, D.C. 20006**
INDEPENDENT AUTO REPAIRMEN'S VIEW OF
FEDERAL AND STATE REGULATIONS. THE IMPACT
ON COMPETITION AND THE MOTORING PUBLIC
HS-022 924

**BP MARKETING LTD., P.O. BOX 148, SHELL MEX
HOUSE, STRAND, LONDON WC2R 0DX, ENGLAND**
AIR POLLUTION IN EUROPE AND THE FUEL
SHORTAGE
HS-023 106

**BRITISH LEYLAND UK LTD., TRUCK AND BUS
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THE REGULATION BUS, OR LEGISLATION IN PSV
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HS-023 094

**BRITISH STANDARDS INSTITUTION, 2 PARK ST.,
LONDON W1A 2BS, ENGLAND**
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**CALSPAN CORP., TRANSPORTATION RES. DEPT.,
BUFFALO, N.Y.**
RIDER SKILL INFLUENCES ON MOTORCYCLE
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CATERPILLAR TRACTOR CO.
DESIGNING MOBILE HYDRAULIC PIPING SYSTEMS
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**CHARLES RIVER ASSOCIATES INC., 1050
MASSACHUSETTS AVE., CAMBRIDGE, MASS. 02138**
INDUCING THE DEVELOPMENT AND ADOPTION OF
SOCIALY EFFICIENT AUTOMOTIVE TECHNOLOGY.
FINAL REPORT
HS-022 984

**CHI ASSOCIATES, INC., 1011 ARLINGTON BLVD.,
SUITE 316, ARLINGTON, VA. 22209**
REVISION OF SIMULATION MODEL OF AUTOMO-
BILE COLLISIONS (SMAC) COMPUTER PROGRAM:
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ENERGY SAVINGS WITH MULTIGRADED DIESEL
LUBRICANTS - AN EXPERIMENTAL TEST DESIGN
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HS-023 020

**INPUT OUTPUT COMPUTER SERVICES, INC., 689
CONCORD AVE., CAMBRIDGE, MASS. 02138**
COMPUTER MODELING OF TRANSPORTATION-
GENERATED AIR POLLUTION. STATE-OF-THE-ART
SURVEY 2. FINAL REPORT

HS-023 084

**INSTITUTE FOR PERCEPTION TNO, THE
NETHERLANDS**
RIDING BEHAVIOR OF MOTORCYCLISTS AS IN-
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HS-022 919

**INSTITUTE FOR ROAD SAFETY RES. SWOV, P.O.
BOX 71, VOORBURG 2119, THE NETHERLANDS**
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DRINKING BY MOTORISTS. REPORT AND RESULTS
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HS-022 942

**INSTITUTION OF MECHANICAL ENGINEERS,
AUTOMOBILE DIV., LONDON, ENGLAND**
INTERNATIONAL VEHICLE LEGISLATION--ORDER
OR CHAOS? CONFERENCE PROCEEDINGS, LON-
DON, 22-23 OCTOBER 1974

HS-023 092

**INSURANCE INST. FOR HWY. SAFETY (IHS),
WATERGATE 600, SUITE 300, WASHINGTON, D.C.
20037**
OWNERSHIP OF MOTOR VEHICLES IN WHICH PEOP-
LE ARE INJURED

HS-023 079

**INSURANCE INST. FOR HWY. SAFETY,
WATERGATE 600, SUITE 300, WASHINGTON, D.C.
20037**
INJURY CONTROL

HS-022 940

INTEL MICROCOMPUTER COMPONENTS DIV.
SINGLE CHIP MICROCOMPUTERS IN AUTOMOTIVE
SYSTEMS

HS-022 995

JOHN DEERE PRODUCT ENGINEERING CENTER
THE PHYSICAL AND CHEMICAL CHARACTER OF
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HS-022 980

**JOHNS HOPKINS SCHOOL OF HYGIENE AND
PUBLIC HEALTH, BALTIMORE, MD.**
OWNERSHIP OF MOTOR VEHICLES IN WHICH PEOP-
LE ARE INJURED

HS-023 079

**JOHNS HOPKINS UNIV. SCHOOL OF HYGIENE AND
PUBLIC HEALTH, BALTIMORE, MD.**
INJURY CONTROL

HS-022 940

**JOHNS HOPKINS UNIV., APPLIED PHYSICS LAB.,
JOHNS HOPKINS RD., LAUREL, MD. 20810**
POINT-FOLLOWER AUTOMATIC VEHICLE CON-
TROL: A GENERIC ANALYSIS. FINAL REPORT

HS-023 040

**KRAFTFAHRT-BUNDESAMT, VEHICLE TYPE
APPROVAL, D-239 FLENSBURG, GERMANY**
ADMINISTRATIVE REQUIREMENTS--THE WEST
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HS-023 099

MCKIBBEN ENGINEERING CORP.
MOTORCYCLE DYNAMICS--FACT, FICTION AND
FOLKLORE

HS-022 915

**MECHANICAL TECHNOLOGY INC., APPLIED
TRIBOLOGY SECTION**
DYNAMIC BEHAVIOR OF A 140,000 RPM 3 KW
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HS-022 980

**MINISTRY OF TRANSPORT, MOTOR VEHICLES
DEPT., JAPAN**
ADMINISTRATIVE REQUIREMENTS--THE JAPANESE
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HS-023 098

**MOBIL OIL CO. LTD., 54-60 VICTORIA ST.,
LONDON SW1, ENGLAND**
AIR POLLUTION IN EUROPE AND THE FUEL
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MONROE AUTO EQUIPMENT CO.
THE USE OF TIME/TEMPERATURE ADDITIVE
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HS-023 022

**MOTORCYCLE SAFETY FOUNDATION,
LINTHICUM, MD.**
THE HUMAN FACTORS PORTION OF THE MOTOR-
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HS-022 916

MOTOROLA INC., INTEGRATED CIRCUITS DIV.
SIMPLIFICATION OF SYSTEM INPUTS AND OUT-
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[MICROCOMPUTERS]

HS-022 997

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**NATIONAL AERONAUTICS AND SPACE
ADMINISTRATION, LEWIS RES. CENTER,
CLEVELAND, OHIO 44135**

PRELIMINARY POWER TRAIN DESIGN FOR A
STATE-OF-THE-ART ELECTRIC VEHICLE

HS-022 990

**NATIONAL HWY. TRAFFIC SAFETY
ADMINISTRATION, ENGINEERING TEST
FACILITY, P.O. BOX 37, EAST LIBERTY, OHIO**

43319

CHILD RESTRAINT SYSTEMS TESTING. FINAL RE-
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HS-803 346

CHILD RESTRAINT SYSTEMS TESTING. APPENDIX

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**NATIONAL HWY. TRAFFIC SAFETY
ADMINISTRATION, OFFICE OF STATISTICS AND
ANALYSIS, ACCIDENT INVESTIGATION DIV.,
WASHINGTON, D.C. 20590**

RESULTS OF SPECIAL ACCIDENT STUDY
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GRAM] COORDINATION CONFERENCE, JUNE 12-13,
1974, WASHINGTON, D.C.

HS-803 338

**NATIONAL HWY. TRAFFIC SAFETY
ADMINISTRATION, WASHINGTON, D.C. 20590**

A STUDY OF THE EFFECT OF STRAIN RATE ON THE
AUTOMOBILE CRASH DYNAMIC RESPONSE

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ADMINISTRATIVE REQUIREMENTS--THE U.S.
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SAFETY RELATED RECALL CAMPAIGNS FOR
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STATEMENT BEFORE THE SUBCOMMITTEE ON
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SAFETY ACT, AND THE MOTOR VEHICLE INFOR-
MATION AND COST SAVINGS ACT, MARCH 21, 1900

HS-810 312

REMARKS BEFORE THE MOTORCYCLE SAFETY
FOUNDATION, APRIL 19, 1978, WASHINGTON, D.C.

HS-810 320

**NATIONAL RES. COUNCIL CANADA, OTTAWA,
CANADA**

A SYSTEMS ENGINEERING STUDY OF NIGHT VISI-
BILITY WITH AUTOMOBILE HEADLIGHTING

HS-023 011

**NATIONAL ROAD AND TRAFFIC RES. INST., FACK,
S-58101 LINKOEPING, SWEDEN**

EMERGENCY BRAKE FUNCTION OF INERTIA
BRAKES [SWEDEN; STANDARDS]

HS-022 979

**NATIONAL SAFETY COUNCIL, 425 N. MICHIGAN
AVE., CHICAGO, ILL. 60611**

FLEET ACCIDENT RATES, 1976 EDITION, AND
FINAL BULLETIN FOR THE 1975 NATIONAL FLEET
SAFETY CONTEST, WITH AWARD WINNERS

HS-023 014

**NATIONAL SEMICONDUCTOR CORP., STANDARD
LINEAR INTEGRATED CIRCUIT DESIGN, SANTA
CLARA, CALIF.**

PULSE MODULATION A/D CONVERTER
[MICROPROCESSOR]

HS-022 999

**NATIONAL SEMICONDUCTOR
MANAGING AUTOMOTIVE MICROPROCESSOR IN-
TERFACES**

HS-022 996

**NEW YORK STATE DEPT. OF MOTOR VEHICLES,
ALBANY, N.Y. 12228**

MOTOR VEHICLE STATISTICS. 1976 STATISTICAL
DATA [NEW YORK]

HS-023 041

**NEW YORK STATE DEPT. OF MOTOR VEHICLES,
DIV. OF RES. AND DEVEL., EMPIRE STATE PLAZA,
ALBANY, N.Y. 12228**

THE SIMULATOR AS A DRIVER TESTING DEVICE

HS-023 042

**NISSAN MOTOR CO., LTD., CENTRAL
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